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USSR: Science & Technology Policy

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18140215 Moscow PRAVDA in Russian 5 Apr 89 p 2

[Article by Academicians V. Goldyanskiy and Yu. Osipyan: "Why Are We Behind?: Remarks on Basic Science." Passage in boldface as published]

[Text] **Phenomena typical of the period in which the country's productive strengths were extensively developed had a very strong impact on the development of science and technology and substantially slowed the rate of scientific-technical progress in our society. The result was not only that we fell behind in several science-intensive areas of technology that are of primary importance for the country's national economy and defense (microelectronics and computerized information processing, machine building, biotechnology, medical technology, etc.), but also that we permitted a serious lag in the development of basic science itself. And this with the tremendous and ever-growing material investments which the Party and government are constantly making into the development of the network of scientific-technical institutions.**

For example, we built the world's largest optical and radio telescopes and haven't make a single first-class discovery in astronomy. Despite the existence of the most powerful accelerators, we haven't conquered a single peak in the physics of elementary particles. Unfortunately, this list could go on. What's the matter? Why is our contribution to world science disproportionate to the power of our state and the talent of our people? We are obliged to find an honest and unbiased answer to this question.

At one time Academician A. N. Nesmeyanov, president of the USSR Academy of Sciences, compared the development of sciences with a street battle for possession of a building. First, a breakthrough to a new floor, then spreading out over the floor. Breakthroughs higher—these are main tasks of basic research. They are usually unpredictable, but it is they that entail revolutionary progress not only in the area of the breakthrough itself, but also in many related sciences, in their practical applications, in the scientific view of the world itself. Work to introduce the results of new discoveries and on their technical assimilation is a typical example of "spreading out over a floor."

The overwhelming portion of our scientific organizational activity in the postwar period (including such remarkable advancements as the assimilation of atomic energy and the breakthrough into space) were concentrated on "spreading out over a floor." The USSR Academy of Sciences has gradually stopped looking at "breakthroughs to a new floor" as a subject of primary concern—perhaps precisely because they cannot be planned! At Academy meetings almost nothing is heard about scientific discoveries (except only so-called "diploma'd" discoveries which are registered here according to the line of the State Committee for Inventions and Discoveries, but have little effect on shaping international scientific progress).

However, the fact that the specific content of groundbreaking discoveries in basic science is unpredictable hardly means that it is theoretically impossible to forecast basic trends in its development—this forecasting can and needs to be done.

In the U.S., many special centers and organizations are engaged in analyzing the direction in which science is evolving. From time to time we also carry out regular "campaigns" to prepare such forecasts, but we don't approach it consistently enough.

In essence we lack a full-valued comparison of forecasts and reality, analysis of how sound forecasts are, as well as where and why they are not, and we don't make critical use of the experience gained in past forecasting for future extrapolation. No such requirements are even made of Academy divisions, scientific councils, or institutes, and as a result forecasting suffers from excess specificity, while forecasts are poorly substantiated and uncoordinated with financial planning agency figures.

To put it briefly, forecasting and long-term planning in science need serious improvement. We must substantially reduce the volume and alter the nature of the materials required of divisions, scientific councils, and institutes and pay serious attention to analyzing previous forecasts and their relationship to reality.

The second group of questions, whose solution is just as important for accelerating our society's scientific technical progress, pertains to the processes by which scientific and technical developments make their way to production. This key issue, which determines the level of modern technology and is vital for our national economic, is handled very inefficiently by surmounting tremendous resistance and a large number of contradictions. Again the question arises, why do industrial companies in the West take new developments directly out of scientists' hands, while we "introduce" them, haunting the doorsteps of ministries and departments?

Analyzing these problems, one comes to the conclusion that there is a single answer to both sets of questions related our backwardness in basic science and "introduction." It is rooted in the improper, ineffective system of relationships between science and technology which is reinforced both by government decisions and by the public ideology that has developed here on this issue, an ideology which is persistently cultivated by a significant portion of the government and economic apparatus and, paradoxic though it seems, by many managers of the country's highest scientific-technical institutions.

Let us explain what we mean. Despite the fact that the ultimate, global goals of science and technology (production) are common—to benefit people and the progress of society, their specific goals in this common joint process are different.

The task of science is to learn the laws of nature and society, to acquire objective, reliable knowledge.

The task of technology is the effective use of the knowledge science has acquired for specific goals in the development of production, the progress of society, and, ultimately, the universal benefit of the people.

Therefore, responsibility to the Party and government must be divided among agencies managing science (USSR Academy of Sciences) and technology (ministries and departments) in this country.

The Academy of Sciences is supposed to bear full responsibility for the status and level of science in the country and for the skills of scientific personnel. But it cannot directly answer for the level of development of technology and production in any sector of the country's national economy or relieve the sector partially or completely of this responsibility. These boundaries are now already artificially confused.

It is considered proper to require that science, and the Academy in particular, along with ministries and departments, carry out specific developments and introduce scientific results into economic practice. This is precisely how state and Party decisions on specific issues of the development of particular areas of the national economy are structured. What has been the result?

The leaders of the Academy and its institutions are losing their sense of responsibility for the development and level of basic science in this country. It's been a long time since we have been held answerable for this with any specificity or have been forced to answer why we've permitted such a serious lag in basic science. This is why it became possible to justify ourselves by performing specific scientific-technical developments together with the branches.

On the other hand, branches, with central agencies' blessing and aid, are trying to share responsibility for the specific development of individual technical problems with the Academy. This is in fact leading to the demobilization of the branches' scientific-technical potential. This can be clearly seen in the example of the development of computers here, particularly personal computers. It is no secret that we are seriously behind not only developed capitalist countries, but even states such as Norway, Thailand, Taiwan, Singapore, and South Korea in this field. Who should answer for this and correct the situation? The appropriate branch of industry and no one else, of course. But it puts the blame on science. And the Academy has been forced to create a special lead institute to solve this purely technical problem and involve several more of its institutes in the work. Thus the lead actor has been found—the USSR Academy of Sciences, while the branch only assists it.

Despite the fact that Norway, Thailand, and Singapore have no scientific institutes for this problem, they still produce millions of personal computers, and we still have to buy from them. This is a typical example. A technical problem is being elevated to the rank of a scientific one. The Academy of Sciences is forming whole divisions in this area and electing new Academicians not because they have solved the problem, but because they will solve it (i.e. those who burdened the country with the problem are indirectly being rewarded). But this is not the main thing. The main thing is that the Academy is being distracted from work on fundamental problems, which has fatal long-term consequences.

Branches are not developing the skills and capabilities of their own personnel, they are not giving them serious and responsible tasks, which is also leading to the decline of the prestige of engineering work. We are on the brink of another similar problem—the problem of magnetic storage of information for computers. Annual sales of magnetic storage components in the U.S. is now $40 billion. This is more than the cost of all microelectronics semiconductor components. But our industry doesn't have a single institute to study this. It's not impossible that the Academy of Sciences will be assigned to take on one more problem and to answer for its solution.

In our opinion, the only way which to increase the efficiency of both science and technology is to divide responsibility for science (USSR Academy of Sciences) and technology (branches). This is also a way to involve them in the operation of the economic mechanism.

Branches, fully accountable for technical problems, will be forced to involve science in solving the necessary tasks by giving it a portion of its funds. Only then will natural and proper relations between science and technology develop in solving applied problems and will the problem of introduction fade away.

Technology now knows that science is already obligated to take up its (technology's) problems. It has no alternative, it will ask to use science's results. Hence the ugly problems of introduction. If we take this responsibility from science, then perhaps technology will in some cases not want to hire science to solve its scientific problems. Then many scientific institutions will have only basic research. And then it will immediately be clear who can to this well and who cannot.

Ultimately this doesn't mean that science and its institutions will be relieved of working on the technical problems whose solution our society already needs, or that scientists will have it easy. On the contrary, the task

is to involve science most efficiently in economic processes. But we must find the optimum, naturally functioning mechanism. It seems that this approach to solving this key problem best suits the spirit of perestroika.

Economist on Lag in Basic Science Research

18140202 Moscow NTR: PROBLEMY I RESHENIYA in Russian No 5 (90), 1989 p 7

[Article by Doctor of Economic Sciences G. Lakhtin under the rubric "The Rostrum" (Moscow): "The Self-Unawareness of Science"; first paragraph is NTR: PROBLEMY I RESHENIYA introduction]

[Text] Until recently it was asserted that all the trouble with scientific and technical progress is arising through the fault of negligent production workers, who shun technical innovations as the devil shuns incense. The opinions that the supplier of these innovations—science—is also delivering the wrong "commodity" took over. They began to see a scapegoat in applied, more precisely, sectorial science. The wave of criticism meant for it spread: "Scientific Failures," "Departmental Idlers," "Affiliates of Ministerial Offices".... And only basic science remained in the role of a sacred cow. Now a skeptical view has also begun to penetrate this temple, revealing no less stagnation than in other fields.

It is possible to judge the trouble from a number of indirect indicators. Per 10 million inhabitants the number of winners of Nobel Prizes in the field of the natural sciences in our country is one-tenth that in the United States and Western Europe. If we take domestic prizes (Lenin, State), we will see that they are being awarded more and more not for outstanding results (discoveries), but for "a series of works in the area of...," that is, for many years of "hammering" on one theme. The level of citation of our authors in world scientific periodicals is about one-twentieth that of American authors.

We know that the situation is bad, but for the present do not know what to do, although there are plenty of recommendations. Many prominent scientists from the heights of their experience, biases, as well as official level are expressing their opinion very categorically. Often their positions are diametrically opposed. One of two things remains: either to organize on each question a kind of plebiscite and to seek the truth by a vote or to approach science scientifically, that is, to seek solutions on the basis of in-depth systematized research. And here it turns out that basic science is an unknown country.

Let us begin with the fact that we do not know unequivocally what basic science and basic research are. Some people attempt to identify them with purely theoretical science and research and regard as the main distinctive feature the absence of a practical orientation, others assume the main feature to be the scale (amount of work), still others assume it to be substantial changes in the system of knowledge. Often people regard as basic the operations which are being performed at institutes of the Academy of Sciences, which leads to the confusion of the concepts "basic" and "academic" science (in reality about half of the operations within the walls of the academy are of an applied nature). And these are by no means terminological disputes. Due to the lack of a universally accepted formulation statistical record keeping is also absent. Consequently, we do not know what the amount of basic research actually is, whether it is increasing, and how it is broken down among the academy, higher educational institutions, and sectors.

One ignorance leads to another. There are no criteria, by means of which it would be possible to compare, for example, the level of basic science in our country and abroad. This conceals the scale of our lag. Whereas for applied science some generalized indicators exist, for basic science such for the present have not been found. It remains to use either indirect measurements (like the statistics of Nobel Prizes) or individual examples. Thus, Academician R.Z. Sagdeyev estimated the contribution of Soviet scientists to modern physics of the microcosm at 1-2 percent. But examples, as is known, cannot replace descriptions of the overall state. The most promising steps "will disappear in the sand," if there is no objective estimate of the lag and the progress.

The simplest of the steps being proposed is to increase the allocations for basic research. For comparison, in the United States in 1988 they came to $15 billion, in our country, according to rough estimates, they came to 1 billion rubles. But if we permit the sharp increase, by several fold, of the assets being allocated, will this be able to increase the level of basic knowledge?

And here once again is the chain of our ignorances. Without having isolated basic science, starting with terms, we will not find out how profound the differences are between basic and nonbasic research, and, therefore, we will not be able to judge with confidence whether a special, distinctive mechanism of planning is needed for basic research. And even, moreover, whether planning in the usual sense of this word is needed at all. Here it is appropriate to turn briefly to history.

Enthusiasm, intellectual freedom, and independence in the choice of problems and the means of their solution were characteristic of science of the 1920's. The essence of its management reduced to creating, as far as possible, the conditions for the work of the scientist and to letting him work. Mass science of the 1930's should have become first of all organized science. A mechanism of planning, which placed under control the substantive aspect of activity, was put into effect. State discipline succeeded academic freedom. Successes began to be measured not by discoveries, but by the fulfillment of the plan assignments.

Moreover, a management apparatus, which consisted of people, to whom the substantive aspect of scientific work was incomprehensible, appeared over science. This step led to averaging, to the firm establishment of "the principle of universal mediocrity."

At this turning point the organization made the individual subordinate to itself and suppressed creative individuality. But science needs first of all not columns of performers, but individuals.

Now, apparently, we are faced with a dilemma—Are we to dismantle the established bureaucratized system and to release basic science or to build a new, purely basic science, without doing away with old science, for which its own place will be found? Is it not this idea that was the basis for the establishment of the Novosibirsk academy campus, until the machine swallowed it up?

People will immediately respond to this—Is another academy really to be established? Or is it perhaps better to turn to world experience, which testifies that basic research is being developed very successfully at universities? In our country the thorough demarcation of science and higher education occurred at one time. Now, when the problems of scientific and technical development are appearing in the forefront, it is probably time to supplement and, perhaps, replace the principle "while learning, do research" with counter principle: "while doing research, learn." In other words, to put in first place the research process, regarding the educational process as a means of its support.

It is a matter here not only of the use of the abundant intellectual potential of professors and instructors of higher educational institutions, on which emphasis is usually placed. Another thing is more important. At the higher school the flow of problems, which are identified during training, meets with the flow of young minds, which are not burdened by the stereotypes of fixed truths.

Here it is appropriate to recall the scope and importance, which were attached in the United States to the Merit program (the identification, encouragement, and advancement of talented young people, starting at childhood), as well as the fact that the majority of discoveries, which have been awarded the Nobel Prize, were made within the walls of universities.

What is hindering basic research? Why did the Academy of Sciences, which acted at the beginning as the center of this work, begin to lose this role? Apparently, a set of reasons is in effect—many years of persecutions of "pure" science and its exponents, the established procedure of planning, which orders one to know even before the start of work with what it will conclude, the system of the remuneration of labor, which does not recognize talent and industry, the weakness of the material and technical basis, and much else.

Whatever the minds are like, they are helpless in our times without technical supply. Meanwhile, the supply of our science with instruments and equipment is one-fifth to one-third that of American science. But the matter is not confined to the quantitative difference, the qualitative difference is more important: a smaller assortment, worse parameters, a lower resolution, and so on. Hence the inevitability of our lag along the entire front of the natural sciences.

The boom in the area of scientific instrument making, which was observed in the West over a long period, only emphasizes our dismal picture. And again we are confronted with unawareness—it is unknown even how much operating research equipment there is in the country (an inventory was suggested, but was not taken) and what its qualitative characteristics as compared with the world level and its age structure are.

Many facts testify to the "making applied" of academic, as well as VUZ [Higher Educational Institution] science, which is manifested in the increase of the proportion of operations that from the very start pursue practical goals. Academic institutes are more and more often concluding contracts directly with enterprises and associations, bypassing sectorial science. They are shifting from research to development, from development to the output of a physical product. All this is very good, but if it proceeds this way further, we will have two applied scientific systems (sectorial and intersectorial) and not one basic scientific system.

And once again unsettled questions arise: Is it necessary to compensate the Academy of Sciences for the diversion of a portion of its forces for applied operations for the purpose of maintaining the amounts of basic research if only at a stable level? How is one to organize stimulation so that talented young people would be drawn into basic science? Is the system of grants, that is, individual subsidies for a declared theme or direction of work, applicable under our conditions?

The ignorance of all this is a product of stagnation and one of its clear manifestations. The exposure of the actual state of affairs suits least of all high scientific management. Resistance to changes begins with resistance to the study of the objects of the proposed changes.

The knowledge of trouble requires the taking of steps, moreover, complicated ones, which require efforts and expenditures. But efforts are hard for tired organs. That is why the self-unawareness of science or, to put it better, self-ignorance is convenient, inasmuch as it includes not only ignorance, but also the disinclination to know.

The lag in the area of basic research not only is creating the threat of pushing our science back among second-rate sciences, but also is undermining in general the positions of the state.

There is one solution—the organization of an in-depth and comprehensive study, with the enlistment of the most competent specialists, is necessary. I do not know how, but it is necessary to convince management and society of the need not to skimp on the conducting of

studies of this sort. Economizing on them leads to an even greater lag in the most vulnerable area for us—the organization and management of scientific and technical progress.

Academician Osipyan Calls for Removal of Ministry Controls

18140191b Moscow ARGUMENTY I FAKTY in Russian No 10, 11-17 Mar 89 p 3

[Article by Vice President of the USSR Academy of Sciences Academician Yuriy Andreyevich Osipyan, director of the Institute of Solid-State Physics and Hero of Socialist Labor, under the rubric "We Present the Candidate": "Yu. Osipyan: On a Scientific Basic"; first paragraph is ARGUMENTY I FAKTY introduction]

[Text] Yuriy Andreyevich Osipyan, academician, vice president of the USSR Academy of Sciences, director of the Institute of Solid-State Physics, Hero of Socialist Labor. He has been nominated as a candidate for USSR people's deputy from the Academy of Sciences.

Science and scientific knowledge, just as culture, are the property of the people. Society and the state should devote constant attention to its comprehensive development. Unfortunately, now the point of view that the only criterion of the evaluation of the development of science is the possibility of the immediate practical use of its results, has begun to dominate. I regard such a view as oversimplified. Without basic scientific research progress is impossible.

It is necessary to increase the role of science when drafting the most important legislative acts.

Important decisions should be made after open public discussion in the corresponding Soviets. Here scientific organizations should have the opportunity to prepare their own versions of decisions, which are alternatives to the ones which executive organs (the State Planning Committee, ministries, and departments) prepare. The suggestions of scientists should be discussed in legislative organs (the Supreme and local Soviets), and not in executive organs (the Council of Ministers, planning commissions, and departments).

I believe that it is necessary to halt completely the promulgation of departmental instructions and other enforceable enactments, which replace laws. While many previously adopted instructions should be carefully reviewed and, if necessary, repealed as obsolete.

If I receive the mandate of a USSR people's deputy, I will promote the consistent establishment of democratic principles in the organizational management of scientific institutions and will resolutely speak out for:

— the appointment by election of scientific councils by the scientific collectives of institutes;

— the appointment by election of the executives of institutes by the corresponding scientific collectives;

— the appointment by election of the executives of scientific subdivisions of institutes by the scientific councils on the recommendation of the scientific collectives;

— the passage of laws, which clearly regulate the rules and procedure of the granting of scientific organizational positions, the conditions of the conducting and financing of scientific research, and the copyrights to intellectual property;

— the abolition of the system of the certification of scientific personnel and the return to the system of the periodic appointment by election of all scientific personnel in case of the competitive filling by them of all scientific positions.

I will also insist on the passage of laws on the formation of three types of organizations, which unite scientific personnel in the USSR:

a) associations of scientific personnel of the USSR;
b) professional scientific societies;
c) departmental scientific organizations and institutions.

Along with the stated principles, which concern science and scientific research, I consider it necessary to take the following steps of a state nature:

— to separate the spheres of responsibility of legislative, executive, and judicial organs;

— to support resolutely the self-management of enterprises and their real cost accounting and self-financing;

— to change over without delay to wholesale trade in means of production and raw materials;

— to revise the Law on the State Enterprise for the purpose of its replacement by the Law on the Socialist Enterprise on the basis of the Law on Cooperation;

— to focus the basic investments, which are going into the agrarian sector, on the assurance of the storage and processing of agricultural products;

— to develop extensively cooperation with a flexible tax system; to achieve state support of production and construction cooperatives (with the granting to them of preferential credits and the minimum taxation);

— to accept the primacy of human values in USSR foreign policy.

Academician Osipyan Advocates Formation of Scientists' Union

18140196a Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Mar 89 p 2

[Interview with Vice President of the USSR Academy of Sciences Yuriy Andreyevich Osipyan, by TASS correspondent S. Turanov for SOTSIALISTICHESKAYA INDUSTRIYA: "What Is the Union of Scientists To Be Like?"; date, place, and occasion not given; first paragraph is SOTSIALISTICHESKAYA INDUSTRIYA introduction]

[Text] As was already reported, the initiatives of a number of scientific collectives on the establishment of a union of scientists of the country were supported at a meeting of the Presidium of the USSR Academy of Sciences. Vice President of the USSR Academy of Sciences Yu. Osipyan, supervisor of the working group for the discussion of the proposals received from the scientific community and candidate for USSR people's deputy from the Academy of Sciences, gives an account.

Yu. A. Osipyan: Now the public activity of scientists is not organized on the all-union level. Therefore, the idea of establishing such an organization of scientific personnel for a long time now, as they say, "has been in the air." Many scientists have expressed it. This is a consequence of the sharply increased social activity of people, which was awakened by restructuring.

The basic goal of the establishment of a union of scientists is the uniting of the public efforts of scientific personnel of academic, sectorial, and VUZ [Higher Educational Institution] science. It, as it seems to me, will organize the holding of elections from the scientific community, including USSR people's deputies, will participate in the discussion and making of recommendations on such urgent problems as environmental protection, disarmament, and public health, and will make evaluations of global projects that have been completed by state organs. Questions concerning scientific ethics should also be in the competence of the union.

SOTSIALISTICHESKAYA INDUSTRIYA: Who will be able to join the union?

Yu. A. Osipyan: Like any creative organization, the union will unite personnel, who in practice have demonstrated professional abilities. As an "entrance qualification" it is possible to suggest for discussion the existence of an academic degree. Then this public organization, if all candidates and doctors of sciences wish to join it, will have 200,000-300,000 people.

SOTSIALISTICHESKAYA INDUSTRIYA: Will the new organization not be a certain counterbalance of existing ones, for example, the USSR Union of Scientific and Engineering Societies?

Yu. A. Osipyan: We are not setting as a goal the "enticement" of people from other public organizations. Everyone is free to participate in the work of any of them. But, as it seems to me, some reorganization of the institution of professional scientific organizations should be carried out, and the corresponding suggestions are contained in my election platform. The scientists of several occupations, for example, physicists, thus far do not have their own scientific society. But such organizations could hold a public discussion of reports on urgent problems and formulate recommendations on the consideration of individual proposals and projects, which are independent of the departmental evaluation. It is time to revive the traditions of many professional societies, which ceased existence in the 1920's.

SOTSIALISTICHESKAYA INDUSTRIYA: Does a draft of the charter of the union of scientists exist?

Yu. A. Osipyan: Several of them have been drawn up at academic institutes. Now it is necessary to take into consideration the opinions of representatives of sectorial and VUZ science. The draft of the charter will be considered at the constituent congress of the union, which it is proposed to convene already this year. And will be modified with allowance made for the opinion of its delegates.

SOTSIALISTICHESKAYA INDUSTRIYA: Yuriy Andreyevich, now several enterprising groups are also performing work on the establishment of an all-union public organization of scientists.

Yu. A. Osipyan: It seems that it is more useful to unite our efforts. Scientific personnel should be guided not by personal or departmental vanities, but by the goals of the establishment of the new organization. We are striving for the extensive discussion of the principles of the activity of the future union and the formation of its constituent organs. The working group will support any sound idea that concerns these questions. I believe that in the process of establishing the union there should be no dictation on the part of management organs of the USSR Academy of Sciences and sectorial and VUZ science. It should be most democratic.

New Resolution 'Heavy Blow' to S&T Cooperatives

18140191a Moscow NTR: PROBLEMY I RESHENIYA in Russian No 3 (90), 1989 p 4

[Article by Candidate of Economic Sciences O. Osipenko and Yu. Romanenko, chairman of the Komsozitron Scientific Production Cooperative, under the rubric "The Rostrum": "A Noose for Cooperatives"]

[Text] Many people remember Lenin's brilliant analysis of economic monopolism of the beginning of the century and, in particular, the description by him of the subtle techniques of the competitive struggle. The classic writes about such methods of economic suppression as the

deprivation of raw materials and manpower, the disorganization of transportation service and supply, the contract with the consumer on the conducting of trade relations exclusively with cartels, the systematic beating down of prices, the deprivation of credit, and the declaration of a boycott. But life does not stand still. If the magnates of financial capital find out about our present methods of competition.

The government decree "On the Regulation of Individual Types of Activity of Cooperatives in Conformity With the Law on Cooperation in the USSR," for example, could be cause for inescapable jealousy.

The decree was adopted at the end of December 1988. It must be said that the typical reaction for the administrative bureaucratic system to the imperfection of basic legislation, in this case the Law on Cooperation, was reflected in it.

Yes, the Law on Cooperation, as we now clearly understand, was put into effect with defects. As if in mockery of the new artel wave it proclaims the principle "everything not prohibited is permitted," but does not contain prohibitions themselves. But the question of prohibitions is serious, and it would have been easier to sacrifice a good half of the articles of the law, which are mainly declarative, than the coverage of this question, which is very urgent for cooperatives. The apparatus took advantage of the blunder of legislation and established the list of prohibitions in secret.

What in conformity with the decree are cooperative members prohibited to do? In addition to administratively and criminally punishable actions (was it worthwhile, however, to duplicate the codes?) and actions pertaining to the exclusive monopoly of the state, there came to be here (I cite the official comments) "those types of activity of cooperatives, which are capable of causing harm to the health, morality, or property of people." For a normal person, who has not been infected by the prohibitive legislative traditions of the past (and the cited criterion clearly follows them), a question naturally arises: Do there exist types of economic activity, and particularly cooperative activity, which are guaranteed not to be capable of doing harm to man, nature, or the economy? The cooperative sphere of services erects on the wall a shelf, the latter falls on one's head; a mechanic repairs a motor vehicle, upon leaving the workshop its brakes do not work; a coach trains a school child for a higher educational institution, he "fails" and due to a nervous breakdown ends up in the hospital. Is it possible? Completely. In other words, no one is insured against sloppy work. The same thing, by the way, also goes for the state sector. So then, are all types of cooperative labor to be prohibited as "potentially dangerous?" An affirmative response follows unequivocally from the criterion suggested by the authors of the decree ("a new Raskolnikov might make use of an axe—let us prohibit the sale of axes"). But no, here the comrades from the apparatus suddenly found a sense of proportion. Of the most importunate rivals of the state sector cooperative movie and video showrooms, as well as public dining cooperatives, which operate "under conditions that do not meet sanitary requirements," ended up on the list of direct prohibitions.

True, in the latter case healthy legal understanding, as it seems to me, abandoned the authors of the document. Can medical cooperatives really operate with the violation of, well, say, the rules of sterilization? (And how about state polyclinics!) Will a fireman tolerate at the headquarters of a construction cooperative a bare wire, while a worker of a sanitary and epidemiological station will tolerate, forgive me, stinking scraps near a cooperative for leather working? Of course not. And nevertheless the lifting gate in front of these cooperatives for some reason has not been lowered. Apparently, precisely cooperative cafes seriously affect someone's nerves.

For all the enormous respect for so-called state monopolies, particularly the currency monopoly, it is still difficult to understand why cooperative members have been prohibited to accept currency in cash from foreign customers. This hardly conforms to the spirit and letter of the decree on the restructuring of foreign economic activity, which was adopted by the Council of Ministers (incidentally, 3 weeks before the publication of the document being analyzed), and to the policy of the establishment in the USSR of open economic zones. Or is it implied that in the latter cooperatives will not be able to launch their own activity on equal terms with state enterprises?

The Law on Cooperation was also "brought near" the administrative bureaucratic system by another of its articles, Article 54, which is inconspicuous at first glance: "The peculiarities of the application of this Law in individual sectors of the national economy and to individual types of cooperatives are specified by the USSR Council of Ministers." The reaction was nearly instantaneous. An entire group ("individual types") of cooperatives is not permitted to operate only after the conclusion of a contract with the state organization, for which the characteristic type of activity of the artel is basic. Why? For control. Such, in any case, is the official version. But it is strange that the newly fledged inspectors "through the combining of jobs" are rivals of the cooperatives.

A concealed blow has been dealt to scientific and technical cooperatives. The point is that several of them deal with resources (parts, ingredients, raw materials, and so forth), which contain precious metals. The authors of the decree, apparently, forgot that, for example, silver is not only an object of the longings of criminals, but also one that is actively used in chemistry, which has been put on line, electrical engineering, and other sectors at the meeting point of science and production. Now, if the cooperatives, which have emerged in this, do not obey the authority of the suzerains from the state sector and

do not conclude with them contracts for "sponsorship," like "speculators in foreign currency," they, to all appearances, will be dealing with comrades from very special organs. That is how matters stand with the equality of the socialist sectors of the economy.

The adopted decree is one of the demonstrations of the crisis of the administrative system. Its classical model implies the exercise of control functions with respect to local economic units by specialized state organs. First of all by ministries and departments themselves. And up to now it was considered to stand to reason that the Ministry of Health can check in a qualified manner the sanitary level of the service of clients of the medical cooperative, the State Committee for Publishing Houses, Printing Plants, and the Book Trade—the observance of the requirements of legislation in the sphere of publishing activity by the editorial board of a cooperative monthly, the State Committee for Public Education—cooperative lecture measures, and so on. By the promulgated decision on "contractual relations" of cooperatives and their controller-rivals the 2 million managers of the central apparatus displayed their own ineffectiveness. To all appearances, there is emerging in the national economy the institution of "hazing of conscripts" (moreover, legalized), when the "officer corps" of the central apparatus of ministries and departments shifts its control and "educational" duties onto "senior civilian employees"—the administration of enterprises of the state sector, which by the economic logic of interrelations have in reality the same rights as the "recruits" from the cooperative and individual sector of the national economy.

The inevitable product of such relations, which is well known even from army practice, is the cult of coercion and the predominance of informal relations over regulation relations. They will also not be slow to appear in the "vassal-suzerain" relations of cooperatives and the administration of state enterprises. For the present it is unclear to what precisely the contract (in civil law the contract always was the right of a juridical person, now it has been transformed for cooperatives into a duty) will formally bind them. But it is quite obvious what will occur in reality: the "shadow economy" from the offices of local organs, where now the most delicate decisions on the fate of cooperatives are being made, to a significant extent will move to the offices of the state organizations that are the guardians. The power of well-off managers, it must be thought, will sharply increase their standard of living. While the civilized cooperative member, who does not know how to give bribes in direct or indirect form (for example, by taking the chief engineer of the suzerain enterprise on the staff of the cooperative), will inevitably be torn away from the cooperative movement.

Incidentally, the situation, as it seems to us, is not hopeless. Comparatively soon the credentials of the USSR people's deputies will be presented to the representatives of scientific and technical societies of the USSR, unions of cooperatives, and other public organizations, which are vitally interested in the assurance of the actual pluralism of the relations of socialist property. By way of the monitoring of the activity of the government they can (I believe, are simply obligated to) raise the question of the repeal of the December decree as being at variance with Article 11 of the Law on Cooperation, from which it follows that permitted cooperative activity can be carried out not only under a state organization or enterprise, but also independently. While for us this can become a kind of touchstone, on which the activity of our deputy is tested.

The decree "On Steps on the Elimination of the Shortcomings in the Established Practice of Pricing" develops the "success" of the December decision. Alas, bad premonitions again did not deceive those who sympathize in a disinterested way with the "small-scale economy"—a new barrier on the path of new cooperation, which is thorny as it is. We read: "For the purpose of streamlining prices at cooperatives of public dining the executive committees of the local Soviets of People's Deputies are charged to establish the maximum extra charges for their products with allowance made for the level of service as applied to the amounts of the extra charges that are in effect at state enterprises of the corresponding categories."

"Well, what of it?" a reader of NTR asks. "What do we care about 'shashlik makers'?" But the point is that the decision, we are convinced, concerns the entire "small-scale economy" without any exceptions. Is it possible to link with cooperation one's long-range life plans and to invest assets and ideas in it, if the laws on cooperation and individual labor activity are "adjusted" almost monthly by pressure decisions of the apparatus?

Moreover, there is the opinion, and the authors of these lines share it, that the antirestructuring forces are testing their teeth on the "small-scale economy." This is being done—the times are now different—extremely precisely, gradually, without a fuss. But when the jaw closes, the turn of the lease model of cost accounting, the farm, joint ventures, joint stock associations, commercial banks, and so on will be next. Precisely for this reason we want very much that our appeal to the candidate people's deputies would be heard.

Interview With Chief of S&T Cooperative

18140196b Moscow IZOBRETATEL I RATSIONALIZATOR in Russian No 12, Dec 88 pp 6, 7

[Interview with Candidate of Technical Sciences M. Bekman, chairman of the Moscow Myslitel Engineering Cooperative, by L. Lifshits, under the rubric "The Academy of Business Initiative": "A Hurdle Race"; date, place, and occasion not given; first paragraph is IZOBRETATEL I RATSIONALIZATOR introduction]

[Text] A few questions for Candidate of Technical Sciences M. Bekman, chairman of the Moscow Myslitel Engineering Cooperative.

IZOBRETATEL I RATSIONALIZATOR: Please, a general description of your cooperative.

M. Bekman: Our Myslitel was established in 1987. Now it has about 70 people and somewhat fewer people are cooperating with us through contracts. In all 50 people receive a wage, the remainder so far have not joined, have not found themselves. We develop a model, accessories for its production, the technology, and all the design and technological documentation, produce a trial batch of items, give the client calculations on the required physical and technical assets, and, what is very important, submit a calculation for the upper limit of pricing, so that the output of the product would be profitable, while the item would be competitive on the domestic market.

IZOBRETATEL IRATSIONALIZATOR: Construction workers would call such work "turnkey."

M. Bekman: And it is necessary to work only "turnkey." Here we developed and delivered to the client in such a manner the Kvarts-7 electric radiant heater, which is being put into series production at the Metkhozizdeliy Plant No 6. Now the fact that at the Stankokonstruktsiya Plant attached to the Experimental Scientific Research Institute of Metal Cutting Machine Tools the capacities in electronics for NC machine tools are underutilized, is giving us no peace. They must be utilized! Availing myself of the opportunity, I want to appeal to the readers of IZOBRETATEL I RATSIONALIZATOR: we need inventions for electronic games, which in production would be quite inexpensive. Incidentally, for the present only one game, "Just Wait," is being produced here. It would be possible to enlarge the assortment, if suggestions on various attachments to televisions were received. And, finally, we would like to develop an apartment radiotelephone, so as not to drag among the rooms the set with the cord, but to speak from any point of the apartment. Abroad such sets are being used widely. Our last development is an automatic shop for the production of badges.

IZOBRETATEL: I IRATSIONALIZATOR: Where do you get the production capacities?

M. Bekman: The cooperative has its own small shop, with an area of approximately 500 square meters. It is a bit crowded. Therefore, we most often lease the second shifts at underutilized plants. At the same time we fill their orders. It is profitable both for the enterprise and for us. In this case we work at the state rates, but in the cooperative the overhead is several fold less, and the difference goes to the revenue of the cooperation, that is, to our comrades in the wage. Incidentally, we not only lease shops of plants. Recently in the Urals we took over a shop for the processing of Ural gems, which was unprofitable. There were there 14 management personnel per 10 foremen. We put them to work at machine tools, updated the items being produced, and now are thinking of selling them for currency through the corresponding trade network to foreign tourists.

IZOBRETATEL I IRATSIONALIZATOR: Are your developments being completed at the level of inventions? Are you receiving inventor's certificates?

M. Bekman: That is a sore subject. Several candidates of technical sciences, highly skilled engineers, designers, process engineers, and experienced industrial designers work at the cooperative. Obviously, all our developments should be completed at the level of inventions. This is both a requirement of the domestic market and a necessary condition of appearance on the foreign market. Before the cooperative we all had worked at long time in industry, at design bureaus, and at scientific research institutes. Many of our comrades have inventor's certificates. But we find ourselves in a deadlock situation. At the cooperative inventor's certificates as such are not needed. At a state enterprise, when receiving an inventor's certificate, I could claim a reward. If the invention was introduced at another organization, for years one had to collect information on the economic impact, to try to get the reward that is due according to the law, and at times to litigate with the enterprise. An entirely different matter is the patent. Previously they practically did not take it: the authors were unable to pay the patent duty. While the enterprise also did not officially register—Why waste money? At the cooperative everything is different. Of course, we are willing to pay the patent duty. Then when an item, which was developed on the basis of a new inventive idea, is sold, and our clients want to series produce it, in conformity with the law they will have to pay us for it an amount which will already be profitable to us.

IZOBRETATEL I IRATSIONALIZATOR: But what relations will the cooperative have with the inventor?

M. Bekman: If the author is a member of the cooperative, we come to an agreement with each other. If he comes from outside and brings a needed patentable idea, we will immediately conclude a contract. And if there is no patent, we will pay the expenses for patenting and will do everything quickly and without bureaucracy. But it is understood that the cooperative should also share in the profits from the realization of the patent. Now our cooperative is attempting to register a production prototype. We invented a certain button. It is necessary, by the way, also to register the trademark, if one will have occasion to trade on the domestic and foreign market. So here is our patent expert.

IZOBRETATEL I IRATSIONALIZATOR:Do you have a patent service?

M. Bekman: Yes, as at the majority of engineering cooperatives. Our patent expert addressed the appropriate application to the All-Union Scientific Research Institute of State Patent Examination. And they began to

send him from department to department. The trouble is that in the existing instructions, which were written by God knows who, the word "cooperative" is not present at all. There are plants, kolkhozes, and scientific research institutes, but no cooperative. And officials, apparently, do not know what to do. There is not a rejection, but there is also not an affirmative decision.

IZOBRETATEL I IRATSIONALIZATOR: But what is one to do about appearance on the foreign market and about patenting abroad?

M. Bekman: Here there is, as they say, a dark forest. Previously patenting abroad was also a very complicated matter: only through state organs, because currency was required. The reasoning is as follows: the cooperative itself seeks a foreign partner firm. In Moscow there are hundreds of their representatives. We offer an invention and "know-how." They undertake the patenting, advertising, and the delivery of the necessary components and even equipment. We undertake only the production. The sharing of revenues is by agreement. But this arrangement absolutely does not keep within the prevailing legislation with respect to all parameters. Therefore, it must be changed as quickly as possible. Without new legislation appearance on the foreign market is pure futile daydreaming.

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Suggestions for Financing Basic Research

18140204 Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 2, Feb 89 pp 103-106

[Article by Candidate of Technical Sciences G. R. Leiashvili, the Institute of Machine Mechanics of the Georgian SSR Academy of Sciences, under the rubric "At the Barricades of the Scientific and Technical Revolution" (Tbilisi): "The Financing of Basic Research"]

[Text] Today the organization of basic science is far from perfection. And the entirely abnormal situation, when scientific research in the area of the basic sciences does not have a client who is interested in the objective evaluation of the quality of the conducted research, is, in our opinion, the basic cause of such a state.

The scientific council of the scientific research organization, at the meetings of which the reports on scientific research work are approved, is an interested organ, those who perform the work belong to it. The reports themselves are unavailable to specialists of other scientific research institutes, inasmuch as the search, the obtaining of copies of these reports, and primary systematization involve a number of difficulties and additional expenditures of labor and time. As a result, the duplication of works is frequent, the coordination of scientific research work on one theme is weak, and the purposefulness of the research being conducted is low. The choice of the direction and method of scientific research, the depth and quality of its conducting, the scientific and practical value of the obtained results, and their topicality in many respects depend only on the conscientiousness and honesty of the scientist, which is not always at its best. For years stereotype reports on scientific research work are churned out, science is as if advancing, but the return from the capital investments made in science is very low.

In applied science the started changeover to self-financing and cost accounting will make it possible to correct the formed situation. The changeover of sectorial scientific research institutes is relatively simple, inasmuch as the work of these institutes is directly connected with the practical activity of the sectors of the national economy of the country and is legally based on economic contracts, which take into account all the aspects of the research being planned. In academic science everything is based on the thematic plans, while the scientific councils of institutes, the objectivity of which is questionable, are the examiners of the results of the performed research and the inspectors of their quality. Therefore, one of the directions of the increase of the efficiency of academic science, in our opinion, is the separation of the performers of scientific research work from those who plan, finance, and evaluate the level of the conducted research. The client of scientific research work should also not be at the same time its performer.

How is one to do this in practice? Let us suppose that by a decision of the General Assembly of the Academy of Sciences the basic directions of the development of science have been specified and the corresponding amounts of financing, which is then distributed by the departments of the Academy in accordance with the consolidated theme of each scientific direction, have been allocated. The choice of these scientific directions and the differentiation for the consolidated theme are carried out with allowance made for the needs of the national economy of the country. Such a financial plan is also the plan of the development of Soviet science in various scientific directions, is actually the process of planning the scientific policy of academic science, and is directly included in the basic functional duties of the Academy of Sciences.

By a decision of the Presidium of the Academy of Sciences a specialized expert coordinating council is formed in each scientific direction. The most prominent scientists and recognized authorities in this field of science, to whom the approval of the scientific research in individual directions, the specification of the thematic plans and the procedure of financing individual scientific research jobs, as well as the final evaluation of the results of research are assigned, are included on it. It approves the candidacies of the supervisors of individual themes, who are selected on a competitive basis.

Although all the responsibility for the quality and depth of the scientific research on a specific scientific research job is assigned to the supervisor of the theme (the head of the laboratory), all the rights are concentrated in the hands of the board of directors of the institutes. On each minor question—the acquisition of scientific equipment, hiring, the official registration of a business trip, the establishment of an individual work schedule, and so on and so forth—the supervisor of the theme has to request permission from the board of directors of the scientific research institute. It is not always easy to get this assistance, especially if personal relations leave much to be desired.

The way to overcome the gap between the rights and responsibility of the supervisor of the theme is obvious; the laboratory should receive the rights that are necessary for the performance of scientific research work at a high scientific methods level. In particular, the supervisor of the theme, who is approved by a decision of the specialized expert coordinating council on a competitive basis, should be the individual manager of the credits and limits, which are allocated for the conducting of the given scientific research work. He should be given the right to determine the manning table of the laboratory and the skills and number of scientific associates, the relations with whom he could legalize by a short-term individual labor contract (a contract for a term of not more than a year). On the one hand, the scientific personnel will be stimulated for intensive work, inasmuch as the contract might also not be extended. On the other, the supervisor of the theme, who is responsible for

the quality and the time of the completion of the scientific research work to the specialized expert coordinating council, receives the opportunity to rid himself quietly of negligent or unskilled personnel.

The proposed system of the formation of the primary scientific creative collective (actually with the rights of a temporary collective) makes it possible to include in this process the healthy spirit of competition, for the conclusion of an individual labor contract will be possible only in case of the desire to cooperate on the part of both parties—the scientific associate and the supervisor of the theme.

Let us assume that the procedure, in accordance with which the total amount of the material incentive will be paid in three parts, is stipulated in the labor contract with the scientific associate. The first part includes an advance that is paid monthly (it seems to me that it is not more than the salary). The remainder of his wage fund, which is paid in a lump sum after a positive evaluation by the specialized expert coordinating council of the completed theme (stage), is included in the second part. If the evaluations are negative, the scientist not only does not receive the balance of the wage, but is also obliged to return the received advance: in this case he is consider a violator of the labor contract with all the ensuing legal consequences. The third part of the material incentive of the scientific collective is formed from the saving on the estimated cost of the theme, which is distributed among the coperformers by means of the coefficient of labor participation.

In the proposed arrangement the status of scientific research institutes as the primary structural unit in the system of the Academy of Sciences will change. Their functions will reduce to the provision of experimental workshops with instruments, computer hardware, and production capacities. In fact, the primary scientific collective (laboratory) will rent premises and scientific equipment and will pay for lighting, heat, and service. The budget of the scientific research institute will be formed from the amounts of rent.

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Success of Cost Accounting at Computer Research Institute

18140193 Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Jan 89 p 2

[Article by TASS correspondent A. Kiyanskiy for SOTSIALISTICHESKAYA INDUSTRIYA under the rubric "Attention: Experience!" (Kiev): "A Risk in the Scientific Fashion"; first paragraph is SOTSIALISTICHESKAYA INDUSTRIYA introduction]

[Text] A year has passed since the Kiev Scientific Research Institute of Computer-Aided Systems of Planning and Management in Construction of the Ukrainian SSR State Committee for Construction Affairs (NIIAS) changed over to cost accounting. And here are the first results: labor productivity in the subdivisions increased by three- to fourfold, while the wages of associates increased by 1.5- to 2-fold. But the main thing is that given the increase of the volume of scientific and technical output its quality improved noticeably.

What is happening today at the Kiev Scientific Research Institute of Computer-Aided Systems of Planning and Management in Construction at first glance causes astonishment. The institute on its own initiative is reducing the prices for its products, is spending tens of thousands of rubles on advertising, and is developing computer programs, which thus far no one has ordered. Finally, the rank and file engineer here, it turns out, earns more than a doctor of sciences.

Whereas the 1987 plan came to 3 million rubles, the control figures of the 1988 plan come to 5.5 million rubles. Moreover, yesterday the problem of marketing did not worry the institute, the main thing was to fulfill the assignment. Now everything is different. They now have to study themselves the market conditions and to seek clients. In short, completely new problems have arisen. Previously the partners did not particularly count money. The institute presented a bill, say, for 100,000 rubles, and they paid it without any arguments: a thousand rubles more or less, what is the difference. And at the institute they often determined the value of their product "roughly."

Now it is a different matter. If you set the price too high, they will decline the services. And at times one even has to deliberately understate it: for there are several institutions of this kind in the country, and one has to fight for a customer. Competition? Yes. And it dictates its own rules. Economic levers have taken first place.

At the Kiev Scientific Research Institute of Computer-Aided Systems of Planning and Management in Construction first of all they established order in the subdivisions that had hindered the work of others. For example, previously the preventive maintenance of the computer began at the start of the workday, and by lunch the computer was idle. Now engineers receive wages only for the hours that the computer is operating. Hence the aspiration to utilize it as much as possible. All the subdivisions of the institute have become participants in the unified technological process, which is aimed economically at the end result.

The simulation model of the changeover to cost accounting, which was developed by scientists several months before the start of work under the new conditions, helped to identify the reserves. All the information on potential users: their specific nature, requirements, specifications, and a description of the technologies, was fed into the memory of the computer. The computer began to help forecast the market conditions, keep account, and monitor the economic activity of the institute.

"Today we have to calculate and calculate," relates A. Gorodetskiy, deputy director of the scientific research institute. "For example, we spent tens of thousands of rubles on advertising. Is it an intolerable excess? On the contrary. The expenses are being recovered with interest. Having notified design organizations of the country of the software, which the institute can already now make available to them, and having let them know about promising developments, we secured hundreds of new orders."

In place of the old computers—bulky and expensive ones—the Kiev Scientific Research Institute of Computer-Aided Systems of Planning and Management in Construction acquired more compact and high-speed ones. They earned the money for retooling themselves. Of course, it would have been possible to allocate a portion of the assets for the increase of wages. But computers are the main equipment, the expenditures on them will subsequently make it possible to derive a considerable profit. For the sake of this it is worth foregoing an immediate gain.

At the institute they are convinced that in some situations it is necessary to take a risk. Of course, having weighed and calculated everything in advance. Here is a vivid example. The forecast of the development of the sector suggested: although in personal computers we lag behind other highly developed countries, in the near future every design scientific research institute will be able to have tens of them. Moreover, it is not ruled out that the saturation of the domestic market will occur "by leaps" (for example, a new plant will begin to produce hundreds of thousands of personal computers). Now there is practically no demand for software for them, but whoever is first able to supply potential clients with the necessary quantity of such products, will derive an enormous advantage. And since this is so, it is worth taking a risk: to throw many forces and assets into programs, having partially reduced the present wage fund. "We are as if going into debt to ourselves," they say at the institute, "in order to return tomorrow several fold more."

Nevertheless, the wages of associates increased last year. And here is what is interesting. The salary in the usual sense plays here the role of an advance. When the work has been completed, a final settlement is made and an additional reward is paid.

"Just do not write 'bonus,'" the deputy director specifies. "This is precisely the wage, which is distributed in an atmosphere of full glasnost—in accordance with the labor contribution of each person."

What are the basic results? Whereas in 1987 the Kiev Scientific Research Institute of Computer-Aided Systems of Planning and Management in Construction filled 170 orders, last year it filled 650. Are comments needed here?

Replacement of Aging Scientific Personnel Planned

18140212 LENINGRADSKAYA PRAVDA in Russian 21 Jan 89 p 3

[Article by S. Samoylis under the rubric "Scientific Commentary": "Why Our Institues Are Aging"]

[Text] At the end of 1986, the USSR Academy of Sciences Presidium decided on the annual mandatory 3-5-percent rejuvenation of the personnel at NII [Scientific Research Institutes] with graduates of vuzes [Higher Educational Institution] and post-graduate schools. This decision was dictated by a desire to attract talented young people to the Academy. But, in the opinion of many well-known scientists, the decree has still not produced the anticipated result.

By 1986, an extremely complicated personnel situation had developed in Academy institutes. Not without basis, specialists linked the drop-off in the influx of fresh, non-traditional ideas which means the slowing in the rate of scientific technical progress to the aging of academic science.

According to data from Academician V. Avduyevskiy, the average age of people defending doctoral dissertations in natural sciences is about 48; that of candidates, 37. Our science has, if you will, become one of the oldest in the world. And the average ages of Academicians and corresponding members of the Academy, 69 and 63, objectively reflect this tendency.

Since the new decision, the directors of Academy NIIs have essentially been given the duty of putting young specialists in positions that open up over the years. However, in most cases preference is still being given to scientists "with seniority." Why?

The decree stipulates that Academy Institutes should replenish themselves primarily from institutions of higher learning. But, for example, last year the Leningrad Division of the Academy's Mathematical Institute could not find strong enough graduates from vuzes to fill all the existing vacancies for specialists and graduate students. The reason—ineffective preparation by the vuzes.

It is now no secret that there is a lot that a person with a diploma of higher education does not know, cannot do, etc. But Academy institutes are the highest level in our scientific pyramid. Therefore, the requirements are elevated, primarily for graduates' practical training.

Today it meets neither the higher or even the most average requirements. This has long been talked about, but there is still very little change for the better. But we do have someone to learn from.

For example, according to the American magazine Mosaic, there is a comprehensive program in the U.S. for recruiting students for the most urgent research at the country's leading science centers. Participation in this program not only develops a taste for creativity, but allows one to develop rather significant scientific baggage and to achieve definite results with which yesterday's student comes to the basic sciences.

But what about our graduates? Most of them do not have vuz scientific preparation, which means that achieving a truly significant scientific result is postponed for many years. Statistics show that our young scientist beginning productive scientific activity is about 10 years older than foreign scientists.

The second "source" for replenishing Academy NIIs is post-graduate students. But they have their own problems. One of the most serious is the cumbersome, multi-stage system of defending dissertations. "The All-Union Certification Commission of the USSR Council of Ministers has created a bureaucratic system which requires tremendous labor of capable young scientists to overcome," states Academician V. Avduyevskiy. "At the same time, without a degree, a young scientist does not achieve the necessary conditions for research. That is, the best years are spent precisely preparing the dissertation."

At the Personnel Department of the Academy's Leningrad Science Center I learned that after the decree the collectives of the Academy's Leningrad NIIs were rejuvenated at an annual rate of 3.2 percent. But what is behind this figure? The current indicators has been achieved primarily by expanding the ranks of institutes. Most Academy NIIs are "aging" as before.

So the long-awaited decree has turned out to be ineffective because of a whole series of yet unsolved problems. Does this mean that science will go on aging? Or that there are other ways to solve this important problem. I would like to know the opinion of specialists and all readers on this issue.

Drawing Youth Into Scientific Careers

18140198 Moscow IZVESTIYA in Russian 7 Mar 89 p 2

[Article by Academician G. Mesyats, chairman of the Ural Department of the USSR Academy of Sciences (Sverdlovsk): "Gifted People or Extras. It Is Time to Destroy the Barriers in the Way of Young Scientists"]

[Text] When I was assigned to the Ural Scientific Center, the first thing that was conspicuous was the absence at several institutes of the concept "young scientist." The average age of doctors of sciences was close to 60; all the headquarters were filled; there was no place for young people. Everyone seems to have understood that an influx was needed, but they said that we cannot. There is no wage. At that time special funds for the remuneration for 2-3 years of all the hired young trainees were allocated in accordance with a decision of the presidium. To

what did this lead? Many directors acted wisely—they selected capable people; others selected anyone, only to "assimilate" the assets which had appeared.

A question naturally arises: How is one to make a selection; what are the criteria? Excellent students? But there are an enormous number of examples of when they do not become good scientists at all. It is probably also possible to use tests, as the Americans do. But, I believe, there is no other way but to agree to a direct experiment—to involve young people in scientific work at the earliest stages.

Various people are needed in science—good theorists and worthy organizers, capable leaders and responsible performers.

How is one to increase the influx of gifted people into science?

The primary thing, in my opinion, is close, informal contact of the scientist with a young colleague, whom it would be a good thing to find back in school. Hence the conclusion: if you want to have a good school and new ideas, participate in the pedagogical process. As, for example, Academician M.A. Lavrentyev did not shun it. It seemed to me that, by using the most abundant experience of contacts of the Siberian Department of the USSR Academy of Sciences with Novosibirsk University and the physical mathematical school, it is necessary to go farther and to include three universities—the Ural, Novosibirsk, and Far Eastern universities—within the corresponding regional departments of the academy. However, the USSR State Committee for Public Education began to doubt whether we would not work only with capable people. Indeed, we cannot place all graduates in jobs. Now in conformity with a common decree of the USSR Academy of Sciences and the USSR State Committee for Public Education the named universities and departments of the academy have been united into educational scientific complexes.

If you speak about the Urals, a unified system has been established here: laboratory—chair, faculty—institute. We were not about to be petty. We are prepared to pay much money for the best students, whom we ourselves select. The Institute of Mathematics and Mechanics of the Ural Department of the USSR Academy of Sciences gave substantial assistance to the university in the acquisition of a large computer complex and personal computers valued at 1 million rubles. A number of joint laboratories have been established. There are no problems of the combining of jobs. The barriers for scientific personnel of the academy in pedagogical and research work have been practically completely eliminated; their reciprocal transfer for a period of up to 3 years is permitted. We established nominal stipends of the Ural Department for upperclassmen who have successes in scientific research work. We are introducing the payment of bonuses for the best competitive and graduation works in the area of the basic sciences. In my opinion, it does no harm to look also at the experience of the United States, where they select capable students very carefully and several newspapers publish an annual list of the names of the most prominent ones. It seems to me that it is advisable to introduce such a rubric in the weekly NAUKA I VYSSHAYA SHKOLA, which is being established, it is all the more necessary to do this in the publications of the regional departments.

While strengthening ties with the university, we are thinking of seeking together gifted children straight from school and are organizing specialized classes and schools.

They are saying and arguing much now about scientific schools. That they are breaking down, that there is much formalism at them. We will be frank, the fate of schools is determined by the aims in the activity of the directors. Is one to consider himself a "chief," a "head," by having his name added to the works of young and not very young people? Or to strive to see to it that there would be as many personalities as possible? Unfortunately, it happens that the student of a well-known scientist on paper is still his errand boy, but abroad they have regarded him for a long time as a professor: they publish his works, quote him, and invite him to prominent scientific centers.

What do I think it is necessary to do so that young people would go more willingly to the academy? First of all we will introduce here without fail an increase of the salaries for young scientists and the level of their wage as a whole. The next question is how to further stimulate them. It is necessary that the total work of a young scientist—articles, inventions—would be stimulated without fail. And not equally, but in an individualized manner, according to the contribution. In our country to this day it is considered terrible if a person were to receive a bonus of 1,000 rubles. But, strictly speaking, why? For the output of one scientist can differ drastically from that of another. In the end one might receive the Nobel Prize, while the other will never become a doctor of sciences. It cannot be helped, such is the reality of the scientific process. We are placing great hopes in the fund for the support of young scientists, which was recently established by the Presidium of the USSR Academy of Sciences.

Now we are expanding substantially the system of foreign practical studies, exchanges, and trips. At the December joint meeting of representatives of the U.S. National Academy of Sciences and the USSR Academy of Sciences, in which I participated, an understanding on the mutual exchange of young scientists was reached. In the United States practical studies and exchanges are an integral part in the system of personnel training. They are willingly exchanging young people in China. Incidentally, even in tsarist Russia this was customary. For example, when establishing Tomsk University from the start it was laid down that all the instructors after a

certain time went on long missions abroad. Our business trip fund for trips abroad is so trifling that it is shameful to speak about it. Such a saving is entirely inefficient.

All hope is now only for mutual exchange. It is impossible to replace business trips and the personal contact of scientists with anything. From the first day I have been working on the commission for the awarding of Lenin Komsomol prizes. In the 21 years of its existence I believe that this prize has played an exceptional role in the formation of young scientists and their schools. But here is what is conspicuous: few individual works have begun to be nominated for the Lenin Komsomol prizes. They are nominating 6-10 people per work, moreover, at times not those who presented the ideas and developed them.

Science in the country is going through a critical moment. The clearing of accumulated obstructions, contradictions, disproportions, and distortions is under way. Real levers have appeared in the work with personnel. Whereas previously we had to complain of the lack of freedom of actions and opportunities, now we can complain only of ourselves. And if in the manning table of an institute the age of doctors of sciences as before is "close to 60," one must not complain of young people. It is we who are to blame.

S&T Progress Dependent on Better Training for Engineers

18140192 Leningrad LENINGRADSKAYA PRAVDA in Russian 10 Feb 89 p 2

[Article by E. Minko, head of the Chair of Economics and Organization of Production of the Leningrad Institute of Aviation Instrument Building, under the rubric "Public Education: The Zones of Research": "How Much an Engineer Is Worth"]

[Text] When they asked Rodin what factor is more important in art: "what" or "how," the prominent sculptor answered "who." In engineering, as in any creative activity, the personality of the creator, of the one who develops new equipment and makes scientific discovers, comes to the forefront.

However, for long years when training specialists in our country the emphasis was placed on quantity. And, it must be noted, we were very successful in this. We train fivefold more engineers, while in the accumulated potential of engineering personnel we lead the United States by 2.5- to 3-fold. We were proud of these figures, while forgetting that in the level of labor productivity we lag behind the United States by approximately fivefold (by twofold in industry, by fivefold in agriculture). But the engineer is first of all the "architect" of productivity. And here it has to be regrettably admitted that the output of our engineer is one-eighth to one-sixth as much as in the United States of America. One may object that the cited comparison is too rigid and does not take into consideration the difference in the skills and social status of the person with the diploma of an engineer. But, if we also take these factors into consideration, the comparison will be even more distressing.

What is the cause of such a low output? It is difficult to answer this question unequivocally; there are many factors and causes here. But the deformed mechanism of the stimulation of labor and the low level of training are most significant.

At present the quality of the knowledge, with which young engineers come to enterprises and scientific research institutes, cannot satisfy either industry or science. It is quite obvious: in order to accomplish the difficult tasks of the scientific and technical revolution, and to accomplish them effectively, it is necessary to train at higher educational institutions precisely creators, and not simple performers.

Even year when assigning specialists we have occasion to hear approximately the same phrase from our partner enterprises: "We will take from you at least 100 engineers, but among them there should be about 20 capable people." One would like to know, is it necessary to train the rest, those whom they consider in advance ballast and take only in addition to capable ones? Do these mediocrities in their scientific and technical solutions not program the lag of our economy for many years to come?

Studies show: under the conditions of the scientific and technical revolution that portion of the increase of labor productivity, which is connected with the skill of a worker, depends no longer so much on the skills and experience of the specialist as on the depth of the knowledge that was obtained in the process of training. Hence, the radical change of the traditional system of education at higher educational institutions and a leap in the quality of the training of engineering personnel are required.

It is possible to influence the quality of training at a higher educational institution only by economic methods. First of all to order enterprises to assume the portion of the expenses, which is connected with the increase of the quality of the training of undergraduates, and, therefore, it is necessary to introduce such a concept as "the price of a specialist."

On the instructions of the RSFSR Ministry of Higher and Secondary Specialized Education economists of our institute calculated that the expenditures on the training of one engineer, who studies in accordance with the program of special-purpose intensive training (the most effective training today), come to approximately 30,000-35,000 rubles. While the expenditures per undergraduate, who after graduation from a higher educational institution will receive the diploma of a research engineer and will go to work in the system of the Academy of Sciences, come to 60,000-65,000 rubles.

Where is one to get these assets? Taking into account that the higher school was always in the remainder sector of the planning of our national economy, one ought not count on additional assistance from the state budget. Therefore, the sectors, which are interested in the influx of skilled personnel, should assume the bulk of the expenses. One might reply to me: enterprises have already begun to pay 3,000 rubles each per graduate. All that is correct, but this figure does not reflect the actual expenditures of the higher educational institution on the training of specialists. There is an obvious discrepancy here between the named and real price. The paradox also consists in the fact that we cannot use the assets that are received from our partners. All the money is transferred to the account of the USSR State Committee for Public Education. And enterprises do not see its actual yield.

However, the possibilities of increasing the quality of training of specialists are limited not only by the material and technical base of higher educational institutions, but also by the lack of assets to additionally stimulate the labor of instructors and undergraduates. Therefore, a

new economic organizational mechanism of the interaction of higher educational institutions with sectors and base enterprises, for which cost accounting relations will be the basis, is needed.

Cost accounting in the sphere of personnel training is a new concept for us. And I know many of my colleagues, who consider the introduction of a fee for a specialist antihuman and all but economic slavery. It is probably worth recall the words of K. Marx about the fact that education from the point of view of the immediate process of production should be regarded as "the production of fixed capital; moreover, man himself is this capital." Consequently, society has the right to require the careful treatment of the specialist who comes to work at a works.

Moreover, it is necessary to clearly understand that enterprises are not paying for a person as such, but for his skills, which are a system of basic, vocational knowledge and skills, which is expressed in the formula "to know—to know how—to want to—to succeed." The consumers in the person of enterprises and organizations, who use the labor of a specialist, should reimburse higher educational institutions for the expenditures on their training in the form of "the price of a specialist." Moreover, each institute should itself establish the contract price, on the basis of the real expenditures and the demand for one specialty or another.

This will force sectors to approach more responsibly the formulation of personnel policy: to order specialists not "for future use," but with allowance made for the real needs. I am convinced that the administration of an enterprise, which has paid tens of thousands of rubles for the training of an engineer, without fail after graduation from a higher educational institution will hire him and will use him in conformity with the acquired skills. Then the problem of the "overproduction" of engineering personnel will probably disappear and the prestige of the occupation will again increase.

But today it is impossible to introduce cost accounting simultaneously at all higher educational institutions: at many the material and technical base is still weak, contacts have not been established with enterprises. Therefore, it is necessary, in my opinion, to begin with an experiment. At the higher educational institutions, where instruction is being carried out in accordance with the program of special-purpose intensive training. Some experience of interacting with base enterprises and sectors on the basis of cooperation has already been gained there. The goal of the experiment is to work out clearly the principles and mechanism of cost accounting relations in such directions as the training, assignment, and use of a specialist at enterprises and scientific research institutes.

Scientists of our institute have drafted standard procedural documents on the conducting of the experiment. On their basis a working group attached to the USSR State Planning Committee, in which representatives of interested ministries and departments were included, prepared proposals and turned them over to the USSR Council of Ministers. One of the basic questions, which are considered there, is financing. At first it should be carried out on a mixed basis: a state budget and cost accounting basis. The portion of the expenses, which is connected with the increase of the quality of instruction of undergraduates (the introduction of computer-aided teaching systems, the purchase of new equipment, additional remuneration of the labor of instructors, and so forth), is at the expense of base enterprises.

The sum of the deductions is determined subject to the number of specialists, whom the given enterprise orders, and the level of their skills. The higher educational institution also acquires broader rights in the area of contractual relations with production associations, institutes of the USSR Academy of Sciences, sectorial institutes, and ministers. The enterprise, in turn, can directly influence the process of training engineers, by making its own demands on the quality of the knowledge of future specialists. Here the ratio between the number of graduates, who have been trained on the basis of a state order and contractual obligations, is specified by the RSFSR Ministry of Higher and Secondary Specialized Education in consultation with the USSR State Planning Committee.

It is necessary to expedite the conducting of the experiment. Otherwise we will simply remain a country, in which people of "average" skills determine the level of the economy.

Latvian Computer Club Develops International Network

18140201 Riga SOVETSKAYA LATVIYA in Russian 4 Mar 89 p 2

[Article by LATINFORM correspondent V. Smirnov: "On the Initiative of Latvian Scientists"]

[Text] An "informal" club for information science has been established in Riga by a number of scientific institutions from Bulgaria, Hungary, the GDR, Poland, the USSR, and Czechoslovakia. The official name of this organization, which originated on the initiative "from below," is the Association of Open Systems (ASOS). Vice President of the Latvian SSR Academy of Sciences Eduard Yakubaytis, who heads the Institute of Electronics and Computer Technology, was elected its president. He is the chief designer of the information network of the USSR Academy of Sciences and the academies of sciences of the union republics. His works have been repeatedly published abroad, including at the prominent American publishing house, the Allerton Press.

"Information science is becoming in our days a powerful productive force," E.A. Yakubaytis said. "Its use in scientific research, the designing of machines, and the development of new technologies is yielding a very large impact. Today hundreds and thousands of computer centers are working on various national economic and scientific problems. And often quite similar ones. How is one to eliminate this duplication? The best solution is to unite computers into networks, so that any user could make use of the necessary information from common data banks. Such networks make it possible to introduce the latest methods of management, planning, and accounting, which is especially important under the conditions of the new principles of management and the establishment of joint ventures. By means of them it is also possible to gain access to foreign sources of information.

"Our institute has been working for a long time now in this direction. As a result the concept of open systems, which has been adopted both in the USSR and in the socialist countries, was formulated and special network devices and programs, which make it possible to interconnect computers of different types, were developed. Our colleagues from the countries of Eastern Europe are also conducting similar development. We are cooperating with many of them in the solution of individual research problems. But today the need for closer scientific and production integration has arisen. Therefore, the idea to organize on a voluntary basis an international club of developers of open systems also originated. Its constituent meeting was held in Riga with the participation of representatives of six countries. Our association is open to all interested enterprises and organizations. In its charter it is stated that it will promote both the development of theoretical research and the devising of network aids and will enlist for this scientific and business partners from various countries."

Development of Moscow-U.S. Computer Link Described

18140194a Moscow IZVESTIYA in Russian 19 Jan 89 p 5

[Article by I. Andreyev (Moscow) and IZVESTIYA correspondent A. Blinov (Washington, D.C.): "Information Is Being Sold and Bought. The Tests of the Moscow-San Francisco High-Speed Computer Satellite Communications Channel Are Being Completed"]

[Text]

Moscow

At its Soviet "end" is the All-Union Scientific Research Institute of Applied Automated Systems (VNIIPAS), which is also performing the functions of a national center of automated information exchange with foreign computer networks and data banks. At the American end is the San Francisco-Moscow Teleport, a noncommercial organization.

"To start with I will illustrate with a specific example the possibilities of advanced information and telecommunications systems," says Doctor of Technical Sciences Professor O. Smirnov, director of the All-Union Scientific Research Institute of Applied Automated Systems. "Any of the so-called users of information—and among them are tens and hundreds of departments and organizations—can receive on his displays 100-150 documents each an hour, once he is connected to a data bank in the USSR or abroad, with our assistance. A printer will very quickly put out a 'paper' copy of the information, which is stored at the other end of the world from the user. Thus, it is necessary to spend 5-6 months of intense work at libraries, say, of scientific and technical literature on the retrieval of sources of the same volume by traditional methods. According to American data, if some study cost not more than $100,000, it was more profitable to conduct it, and not to seek information devoted to similar developments which have already been carried out by someone."

Today there are a large number of banks of the most diverse information in the world. And in order to get one's bearings in this ocean of information, telecommunications systems for the retrieval, processing, and transmission of information: national, international, departmental, interdepartmental, and even cooperative computer networks, are at the service of the user. In all today there are several hundred of them in the world.

A system of this sort has been established and is operating at our institute. Through the All-Union Scientific Research Institute of Applied Automated Systems, Soviet users in many cities of the USSR can connect to foreign networks, while foreign users can connect to ours. There is a computer link with the capitals of all the socialist states and two capitalist states—Vienna and Helsinki. Via these two channels we also connect, so to

speak, in transit, to any world system, to any data bank, wherever it is. The service, of course, requires payment, for the "transit," but it is not always simple and single-stage, it is also necessary to pay. Since Soviet and American organizations are exchanging information more and more often and in a larger volume, it was necessary to simplify and reduce the cost of this two-way contact. In this case by means of the American Intelsat satellite.

The talks on the establishment of a direct satellite communications channel between the USSR and the United States began about a year ago. Representatives of the already mentioned firm from San Francisco, our institute, the USSR Ministry of Communications, and the American telecommunications company IDB Communications Group participated in them. In addition to the services, about which I have already spoken, owing to such a channel governmental and public organizations of our countries will be able to use so-called electronic mail. That is, any message will get to the addressee practically instantaneously.

The condition is as follows: for public and charitable organizations, whose activity is aimed at the relaxation of the international situation, at the decrease of the threat of military conflict, and at assistance to victims as a result of such a disaster, for example, as happened in Armenia, there are the same connection rates. The fee for commercial organizations—banks, joints ventures, large firms—is in accordance with the established rates. For scientific research organizations it is in accordance with moderate, reduced rates. That is, we, the Soviet and American partners, want to establish a flexible system, which will make it possible to strengthen the trust between our countries, which was established as a result of summit meetings and contacts at the highest level.

The testing of the new communications channel is now being completed. Our specialists have left for the Soviet satellite communications center (the Moscow area, Medvezhi ozera). A communications channel from our institute has already been laid there. There has been received from American specialists in electronic mail confirmation of their readiness for the final stage of the tests.

Washington, D.C.

In the opinion of the newspaper THE WASHINGTON POST, "the era of electronic glasnost" has arrived: the All-Union Scientific Research Institute of Applied Automated Systems in Moscow, the San Francisco-Moscow Teleport company from California, and Globenet from the Washington suburb of Alexandria are establishing a USSR-U.S. computer satellite communications line. Globenet President James Lakin tells about it in an interview with an IZVESTIYA correspondent in Washington, D.C.

IZVESTIYA: In the USSR for the present, few people are informed about the peculiarities of computer communications, and in the United States it, apparently for the present, is not the leader in this area.

James Lakin: In our country computers are in use by millions of people. Every other computer has a modem—a device for transmitting messages. So that for the United States this is already a customary and more and more often preferable form of communication.

IZVESTIYA: What is its advantage?

James Lakin: Speed, reliability, and a relatively low cost. Via the keyboard of a computer, which has an outlet to a telephone line, it is possible to converse, like via teletype. However, the main thing in the use of computers in communications is the transmission of text that has been composed in advance, the obtaining of data, which is stored in the computer memory and in numerous "data banks." Via computer communications it is possible to obtain a report, a survey of the news, a weather summary, to find out a theater program, to transmit a large text—an article, a pamphlet, a study. With allowance made for the speed of transmission of messages the computer relieves the communications line. The cost of transmissions of material is reduced to one-fourth.

IZVESTIYA: According to reports of newspapers, computer communication has been established between our countries for the first time.

James Lakin: This is not entirely exact. Our San Francisco partner has already established such a connection via international channels with the USSR Ministry of Communications. Its qualitative stage has now arrived—a computer link via satellites is being developed. This is far more reliable and simple.

IZVESTIYA: What is the role of each of the partners?

James Lakin: The San Francisco-Moscow Teleport supports the transmission of messages; Globenet supports the system of communications with U.S. computers; the Soviet partners do so on Soviet territory.

IZVESTIYA: After this can any American, who owns a computer, contact via your communications line any Soviet citizen who is the owner of a computer?

James Lakin: For now we are establishing a system of users, who are permanent subscribers who conclude a contract with us. For example, the editorial board of IZVESTIYA could through us establish a link with its correspondence centers in Washington, D.C. A report, which has been composed by you, in just a matter of seconds will be on the display of the computer of our

editor and after correction will go to electronic composition. Of course, the appropriate equipment is necessary for this. Our subscribers will have protection against "intrusion"—an arbitrary calling code, which is known only to them.

IZVESTIYA: Who are your first subscribers?

James Lakin: Soviet scientific institutions and American companies which have representations in Moscow. The computer link is of particular importance for firms that are participating in the establishment of joint ventures in the USSR. For example, I know that Combustion Engineering, Incorporated is building a plant in the USSR. At times its specialists might need very urgently the drawings of equipment. They will be able to obtain them by computer from the headquarters of their firm. Moreover, they will be able to quickly send an order for necessary materials.

The expansion of trade and business contacts cannot do without computer communication just as the cooperation of scientists cannot. For example, the universities of our countries can now already conclude an agreement on the mutual use of the data banks which have been developed by them. This is opening new horizons for research. It is possible to conduct scientific seminars via computers to acquaint each other with the content of dissertations and to get opinions at once. In general, not much more time will pass, and we will not be able to imagine how we were able to manage without such a link.

Reforms in LiSSR Information, Computer Centers

18140194c Moscow KOMSOMOLSKAYA PRAVDA in Russian 12 Jan 89 p 2

[Article by Candidate of Juridical Sciences A. Bartusyavichyus, head of a sector of the Lithuanian Scientific Research Institute of Scientific and Technical Information and Technical and Economic Analysis: "Why Is Information Science in Lithuania in Its Death Agony?"]

[Text] We are saying a lot about glasnost. It is also needed for the fundamental restructuring of the activity of information institutions of the republic. But at present here, in my opinion, even the most elementary order is lacking. Why?

The republic information system consists of the Lithuanian Scientific Research Institute of Scientific and Technical Information and Technical and Economic Analysis (LNIINTI) attached to the Lithuanian SSR State Planning Committee and the institutions subordinate to it.

At present one has to admit that we do not have a suitable theoretical model for the reorganization of institutions of the republic information system.

It is possible to illustrate this by Order No 24-K of the director of the Lithuanian Scientific Research Institute of Scientific and Technical Information and Technical and Economic Analysis of 1 March 1988, by which it is envisaged to make the following structural changes at the institute starting on 1 March of this year:

"1. In place of the division of general sectorial problems to establish the division of intersectorial problems, having left the associates in the same positions with the same wage.

"2. In the industrial division in place of the sector of wood processing and the peat industry to found the sector of biotechnology and nature conservation, having left the associates of the sector in the same positions with the same wage (...).

"4. [sic]In place of the division of the pilot operation of automated systems of scientific and technical information (ASNTI's) to found the division of the analysis of information needs, having left the associates in the same positions with the same wage.

"5. In place of the division of scientific and technical analysis to found the division of the analysis of invention, having left the associates in the same positions with the same wage.

"6. In place of the sector of the methodology and the analysis of the management of the development and introduction of new equipment to found the sector of problems of new equipment, having left the associates in the same positions with the same wage.

"7. To transfer the female associates of the sector of the interaction of automated systems of scientific and technical information of the laboratory for the development of the information system, whose work is not connected with the activity of this sector, to the sector of information and technical supply of automated systems of scientific and technical information, having left them in the same positions with the same wage.

"8. In the laboratory for the development of the information system as of 1 May of this year to abolish the sector of the interaction of automated systems of scientific and technical information."

Such a "model of restructuring" of the information system in the republic has already been blessed in the Lithuanian SSR State Planning Committee. Why is there no desire to carry out the more or less radical reform of barely living information science? Today the positions of the Lithuanian SSR State Planning Committee are conservative, and their roots lie deeper than the "wisdom" of temporizing is. In my opinion, they want to leave status quo ante in a number of spheres of the economic and social development of the republic, including in information science.

A realistic, and not an illusory concept of the development of information science in the republic is needed.

Indeed, throughout the country they are acknowledging in the press that at present the scientific and technical information system is unsatisfactory. In all 83.1 percent of the scientific associates and specialists, who work in Moscow, are of such an opinion. The "transport" function—the accumulation of information, its storage and transmission—predominates in scientific and technical information, that is, it performs only the role of an intermediary. A very insignificant portion of the activity (about 20 percent) is the processing of analytical information. In implementing the party and government decrees of recent years, which call information science and information activity an important sphere, the legal situation, which exists at the Lithuanian Scientific Research Institute of Scientific and Technical Information and Technical and Economic Analysis, should be reorganized and changed fundamentally. What would I propose?

A real opportunity exists to do this. At present in the Lithuanian SSR Academy of Sciences there is the Mokslas collective-use computer system, the basic resources of which are concentrated in the Institute of Mathematics and Cybernetics. About 900 personnel use the system.

The 3 computer complexes with 115 terminals operate around the clock. The first and third complexes are intended for extra complicated calculations and the solution of problems of high precision. The second complex processes large files of information. In 1985, the Mokslas system through a packet switching center was connected to the Akademset computer network of the USSR Academy of Sciences and the academies of sciences of the union republics. But the lack of preparation of this network for commercial operation and the incredible prices of communications lines are hindering its practical use. The packet switching center will be used during the establishment of the Infobalt automated information system of the Baltic republics. Moreover, during the establishment of the computer network in Lithuania the decision was made to use the principles of information packet switching.

In the matter of developing the Mokslas system it is planned to use more extensively smart terminals, which have microprocessors and aids for the automatic entering of experimental data, as well as the graphic and electronic display of the results of the computation. Various computers will be linked to powerful machines. It is planned to use personal computers extensively and to increase the capacity of computing resources (L. Telksnis, "Innovations Are Based on Experience," MOKSLAS IR TEKHNIKA, No 4, 1988).

I propose, by using the material base of the Lithuanian Scientific Research Institute of Scientific and Technical Information and Technical and Economic Analysis, to found a republic center of information management technology and policy of the Lithuanian SSR Academy of Sciences. The basic functions of such a unified republic information center are: to improve information service rapidly, to automate the retrieval of information and its processing and transmission, to develop new record banks and expert systems, to establish a unified information system.

In conformity with an all-union scientific and technical program, the establishment of 37 information centers is planned in the USSR. One of them should operate at the Lithuanian Scientific Research Institute of Scientific and Technical Information and Technical and Economic Analysis. At present it is possible to retrieve information by switched telephone lines in the Robotics and the Construction and Architecture data banks that exist at the Computer Center of the Lithuanian SSR State Planning Committee. In these banks there are 112,000 documents. Given the present situation the Lithuanian Scientific Research Institute of Scientific and Technical Information and Technical and Economic Analysis has very negligible changes of fulfilling this task. Why? First of all, because it does not have its own technical base—at the computer center the mentioned and other data banks are being used inadequately, the network of terminals in Lithuania is very tiny (only five terminals are in operation—at the Lithuanian Scientific Research Institute of Scientific and Technical Information and Technical and Economic Analysis itself and at the Shyaulyay Department). The promotion of the information services being rendered is passive. Meanwhile, in conformity with the mentioned program each information center by 2000 should have a minimum holding of 100,000 documents and a network of 15-20 users, which would encompass not only the territory of the republic. Under the conditions of absolute cost accounting and self-financing it is unrealistic to count on the establishment of such a network made up of more than 10 terminals. Not only a strong technical base and modern equipment, but also the corresponding changes in the prevailing enforceable enactments, the freedom of information, and the lifting of Stalin's "iron curtain" are needed so that it would be possible to use efficiently the available and foreign databases and to carry out in them the interactive retrieval of information, by using international computer networks (EURONET, TELENET, TYMNET, DATALINK, SHARP, DATAPAK, and others). In such a case every citizen of Lithuania should be granted the right to use various databases that interest him, in which sources of information, which have been published in the world and are unpublished, have been accumulated: books, journals, articles, works of conferences, dissertations, descriptions of inventions, and others, that is, all fields of science, technology, and production, the economic and commercial activity of states and firms, various spheres of the public, political, national, and cultural life of different countries. It is necessary, finally, to realize that our society is wealthy enough to develop on the political and economic level, but not wealthy enough to make it possible to cast into the wind the enormous social energy, while citizens do not know and

do not see the information on the results of the implementation of their own activity and that of their ancestors. Recently LITERATURNAYA GAZETA published the report that until 1987, the USSR State Archive kept a deep secret of about 20 million documents. At present 2.4 million have been declassified. It turns out that there were no political and military secrets in them. Should the remaining 17.6 million, perhaps, also not be kept so secret from the public?

But what is the situation in the world? In contrast to the expectations of many authors that the United States, Japan, and other developed countries will act in unison and will cooperate in the development of the world information infrastructure, since this conforms to their interests, the entry of these states into "the information age" is being accompanied by clashes between them, which are becoming sharper and sharper, new conflicts and even "an information war," or "a cold war of information," are breaking out.

In the past 2 years, 28 information centers, which are furnished with the necessary equipment, have been founded in the United States. The Paperwork Reduction Act, which was passed by Congress in 1980, made it possible to reduce the spending on the information service of government institutions. In 1986 the number of government publications was reduced by 14 percent.

The fact that 50 percent of the people working in the United States are engaged in information activity confirms what enormous attention is being devoted to information science. At the U.S. Library of Congress alone there are 2,200 terminals on the premises of the library and congress. The number of queries a month comes to 3.9 million.

In the USSR a response is given annually to about 40,000 queries. Thus, only one-third of the needs are being met. In the USSR there is 1 periodical of capitalist countries per 1,000 inhabitants. Information from the socialist countries reaches the user only after 25 months and from capitalist countries after 30 months.

In Lithuania in recent times the Lithuanian Scientific Research Institute of Scientific and Technical Information and Technical and Economic Analysis has annually retrieved information in retrospective databases in accordance with 700-800 queries, the republic scientific and technical library serves by traditional methods about 27,000 users from 3,004 enterprises. There is a similar situation in Latvia and Estonia.

The republic information system would yield a far greater economic impact, if its legal status were changed and the procedure of acquiring new equipment were simplified. Academician Yu. Pozhela, who asserts: "...it is a paradoxical situation: the majority of instructions, which should combat mismanagement, for some reason cannot thus far cope with it, but work beautifully as an obstacle in the way of scientific and technical progress," is correct.

By having given the Republic Information Center academic status, we would count on substantial changes in this area.

Value of Computer Clubs, Games Questioned

18140194b Kiev RABOCHAYA GAZETA in Russian 28 Jan 89 p 2

[Article by G. Radchenko under the rubric "The Experience of Friends": "On Familiar Terms With the Computer"]

[Text] "It is beginning to seem that the long awaited revolution in the area of information science is also engulfing our country"—it is possible to encounter such statements more and more often on the pages of the Polish press. Indeed, numerous firms are offering their clients electronic equipment, spare parts, and service. Cassettes with the programs of all kinds of games, which are recorded on them, appeared following personal computers. True, in the overwhelming majority the equipment is imported from western countries.

However, the familiarization of a wide range of people with the concept "information science" mainly through the black market also has negative aspects.

Professor Wladyslaw Turski, a member of the presidium of the main board of the Polish Society of Information Science, believes that the lack of attention to and disregard for this field of science carry the threat that the electronic subculture will screen from people the true values of information science. For the present for the majority the first (and at times the last) contact with a computer is precisely electronic games. The dangerous identification of information science and electronic toys is starting.

Indeed, it is easiest of all to use personnel computers for entertainment. It is possible to buy cassettes with game programs comparatively easily and to exchange them with acquaintances. At the same time more serious computer users have been confronted with a large number of problems: the inaccessibility of information banks and the lack of skilled specialists and technical literature.

The appearance of special rubrics for owners of personal computers on the pages of newspapers and journals, and then specialized appendices to youth and technical publications was the first attempt to get out of the formed situation. Information materials from throughout the world, educational courses in programming languages, descriptions of games, technical instructions, and so on are printed in them. With time it turned out that such

appendixes are so necessary and popular that they can exist as independent publications. "Electronic" rubrics also appeared in local newspapers.

Today a network of "microcomputer" literature has been established in Poland. It also played a considerable role in the organization of specialized clubs. It is difficult to formulate clearly what this is—a microcomputer club. Some consider it a school for the training of specialists in the area of microcomputers and presume that young people, by studying in courses, will master programming languages and will be able to engage independently in creative work and to write programs that are so necessary in the economy. Although the very members of the clubs often confine themselves to exchanging the programs and literature, which they have.

And still, what is the goal of these organizations? The Abakus Microcomputer Club, the very first in Poland, sees its task in the popularization of information science, the provision of access to equipment to everyone interested, the spread of "microcomputer culture," scientific activity, and the exchange of information.

"The best use of a microcomputer," L. Wilk, founder of Abakus, believes, "is the use of teaching programs. At the time, when there are many pupils in the classroom and the contact between them and the instructor is weakening, the computer can be adapted to the individuality of the pupil. This in many cases guarantees the success of studies."

Another opinion also exists: young people are exhausted as it is by the abundance of information in daily life, and they come to the clubs simply to rest. And when instruction in the principles of programming (it is quite complicated) is offered here, many lose interest in electronics.

It is worth, perhaps, agreeing that if a person is actually interested in the computer, the enthusiasm for games sooner or later will give way to getting to know the real art of information science.

So for the present just as many answers exist to the question of what the microcomputer club should be as do clubs themselves. There are also many, so to speak, informal clubs—family clubs, for example. It is possible to get to know the secrets of information science individually as well, but it is also possible by having united in the Federation of Computer Clubs the organization named "The Tournament of Young Experts of Technology." Here they believe that the clubs should be participants in a systematic, well-organized program of instruction. Therefore, the equipment, organizational structure, and tasks being posed should be similar everywhere. The federation is organized in the following manner. The base is the clubs at schools, enterprises, the place of residence, higher educational institutions, and so on, then there is the level of the provinces attached to the boards of the Socialist Union of Polish Youth and, finally, the Central Computer Club. Now the federation already unites in its ranks 30,000 members of 49 provincial and 215 local clubs. They are engaging in the dissemination of literature, are organizing competitions in programming and program maintenance and in the use of electronic equipment, are making proposals, and are taking a specific part in the computerization of enterprises, schools, and organizations.

In practice a real enterprise is operating: skilled instructors conduct the lessons in courses, equipment is distributed in a centralized manner, their own bulletins are published, and so on.

Of course, the possibilities of the clubs depend on the possibilities of the equipment that they have. But computers, as is known, cost a good deal. Who is financing the lovers of electronics? First of all the Youth and Physical Culture Committee, as well as youth organizations (there are several of them in the Polish People's Republic), patron enterprises, and so on. The club can also earn money itself, by filling various orders, as, for example, Abakus is doing.

And still very many problems remain unsolved. Even if assets are available, it is difficult to acquire equipment. There are also not enough spare parts. Nevertheless, much has been done. For the computer clubs were not established for the training of professional programmers. At first it is sufficient that young people would master the computer and would not be afraid of contact with it.

It would be possible, perhaps, to stop with this. But first let us familiarize ourselves with two reports of TASS correspondents, which came from different corners of the world.

Budapest

To achieve the extensive use of modern computers in the sphere of the control and automation of production processes, communications, as well as education—such a task should be accomplished in Hungary by the end of the current five-year plan. On this basis, up to 150 million forints are being allocated for the development of electronics to 1990.

Tokyo

Japanese children assert that they love computer games more than their own parents. An anonymous survey, which was conducted by one of Tokyo's insurance companies among 7,000 local citizens of school and preschool age, showed such shocking results for adults.

In their scale of popularity they assigned first place without hesitation to video games. As "the greatest valuable" for themselves the young survey participants

indicated the personal computer, which, by the admission of local sociologists, has now become for children here a far more "interesting companion" than friends or a grandmother.

Today it is clear that the future in all branches of our life belongs to information science. Let us admit that for the present we are not ready to meet and to conduct a skilled dialog with a computer. It is necessary to catch up. And to do this already now.

Soviet Programmer Wins Prize for Anti-Viral Program

18140199b Moscow SOVETSKAYA ROSSIYA in Russian 19 Mar 89 p 1

[Article by A. Korkin, datelined Pereslavl-Zalesskiy, Yaroslavskaya oblast, under the rubric "We Report the Details": "To the Attack on a 'Virus'"]

[Text] Ye. Lilitko, a scientist from Pereslavl-Zalesskiy, became the world champion in the "memory battle."

"The 'memory battle,' otherwise known as the 'computer battle'—what is it?" This is how a conversation with Yevgeniy Lilitko, a young scientific associate at the USSR Academy of Sciences' Institute for Programming Systems. began.

"The game's inventor was a computer programmer from the U.S., Alexander Dudney. As general computerization began, the drawbacks of computers, including the possibility of damage by parasite programs, so-called computer viruses, began to be noticed along with their advantages. The idea arose that if someone planted a 'weed' in a computer, then one could also use a 'mower' program to destroy the virus. And these programs battle one another in the machine's memory. It is this duel between programs prepared by rivals that is the essence of the game."

It appeared in 1984 and provides an invaluable opportunity to programmers to hone their skills and to novices to quickly master a new field of knowledge. By the way, the international children's computer camps held every year in Pereslavl-Zalesskiy make extensive use of the "memory battle." Children play this game with great satisfaction. Adults are just as enthusiastic.

Dudney developed the rules and announced them in the press. Fans in other countries began to appear. Japan's programmers were the first to register their fan club. In Europe—FRG, Italy, and Poland. The USSR branch of the worldwide fan club was founded in Pereslavl-Zalesskiy.

"Its members were basically the associates of our Institute of Programming Systems. We're developing our own programs, 'battling' each other," continues Yevgeniy.

Achieving world-class status turned out to be fortunate for Russia's representative. At the previous championship, all prizes were taken by U.S. programmers, but Ye. Lilitko's program won at the last tourney.

"It would actually be more correct to say that the program is the champion, not I personally," smiles Yevgeniy. "After analyzing the past championships from the world society's bulletin, I created my own so that it could beat the programs of the previous first-prize finalists. Then I enhanced it with a subprogram."

Not everything is simple in developing a "memory battle." To become a full-fledged member of the world society, you must pay membership dues in dollars. Yevgeniy might not have made it to the championship, but, by good luck, a scientist from Moscow State University, D. Kavtogradze, paid his dues out of his personal savings from a training program he attended in the USA.

Admittedly, there won't be any problems this year. Yevgeniy turned over his prize for winning the championship to the world society as the Pereslavl branch's dues. But how will things be in the future? There is a solution. "It seems that our athletic organizations could get involved in these matters," says the champion. "There has already been a conversation with DOSAAF [Voluntary Society for the Promotion of the Army, Aviation, and Navy] about financing the society, but so much paperwork is required that it is difficult to count on a successful outcome."

A reliable sponsor is needed. Everything is solved more quickly for branches in other countries.

Meanwhile, there are preparations for a European championship. Its initiators are the Pereslavl branch and branches in the FRG and Italy. Where it will be held has still not been decided.

The unusual game is gaining more and more fans in the USSR. Siberia, the Far East. An unofficial nationwide championship has already been held. Dmitriy Rabov, a schoolboy from Yaroslavl and participant in the international children's computer camps in Pereslavl-Zalesskiy, now a boarding school student at MGU, took its bronze medal. His trainer and mentor was Yevgeniy Lilitko.

And last, the world champion's biography. Yevgeniy was born in Armavir and graduated from Tomsk University. He is a professional programmer. He has worked at the Institute for Programming Systems since 1988. And now he is preparing for new duels.

Physicist Recounts Obstacles to Publishing Article

18140199a Moscow LITERATURNAYA GAZETA in Russian 8 Mar 89 p 12

[Article, datelined Moscow, by Yu. Chukova, candidate in physical and mathematical sciences: "Under the Creak of Windmills: On the Right of a Scientist To Publish His Work"]

[Text] I opened the envelope. The editors of the journal "Biofizika" returned my work on the basis of the reviewer's response, "The article should be rejected as speculative." There were no signatures, therefore I had to guess who these specialists were who use scientific terminology in a very illiterate way and, judging by the response, were entirely unacquainted with a method known for half a century.

It would be a lie to say that this response didn't upset me, but it wasn't entirely unexpected. I had already published more than a hundred scientific works, of which about 20 were distinguished by novelty, which was even held against them.

Nevertheless, every time you get this response, you sit and think what it will be like later. This time I remembered that we have perestroyka all around us, particularly that all sorts of anonymous letters have ceased to be taken seriously, so I decided to find out from the State Committee for Publishing Houses, Printing Plants, and the Book Trade whether they knew about this. The Periodicals Administration responded that "the matter of eliminating closed review from the practice of journals is being studied."

Interesting, I thought, that they are the ones studying it. What then are the problems?

A telephone conversation on this topic revealed that, as early as 1987, the journal "Tekhnika i nauka" published an article with a valid proposal to eliminate closed review, but it provoked serious objections. "Who can oppose it," I said in surprise. "The reviewers themselves?" It turned out that the journals' editors, unhappy with their lot, objected...

And there is reason to be unhappy! To be honest, I don't like closed reviews, but I'm not alone in this. It is them I don't like, not the criticism, since I believe that qualified, professional comments are a most valuable gift to a real scientist. It's like a walking stick, promoting further progress in thinking. However, the rejections I have received don't include any of that kind. They are superficial, thoughtless, or simply degrading responses without indication of specific errors. In contrast, there were quite positive reviews which did reveal flaws. The negative ones had one goal: to delay publication.

Let me present a typical example. The reviewer didn't like the article I sent to "Fizika i tekhnika poluprovodnikov," so the editors didn't want to publish it. I protested, demonstrating the importance of the conclusions it contained. Such errors reminded me of the confrontation of two rams encountering one another on a narrow bridge, with the outcome just like in the verse: "Early in the morning the two rams drown." But in real life this confrontation always ends the worse for the author.

This time I had no desire to drown. And a quite unexpected sequence of events rescued me. Another journal soon printed an article by Academician M. A. Avontovich which published the same formula that mine contained. (Such things happen. Authors totally unrelated to me suddenly simultaneously solve the same problem and obtain identical results.) But the joy—if unwitting co-authors experience joy—was premature. My work, it turns out, lost primacy because of the academician's publication (in fact there were two more new conclusions, but the reviewer didn't even want to notice them!), because they decided only to deposit my article.

Another case. A letter came from a member of the London Royal Society, Prof. P. T. Landsberg, who was developing the same method as I. He said that he couldn't find an answer for one question related to this method. It had already been four years since I had managed to solve it, but I had to be impolite and not answer the elder English scientist's letter, because I did not know how many more years it would take to publish the solution I had found. The "Zhurnal fizicheskoy khimii" wanted nothing to do with it. And I sometimes thought, Let the foreign professor solve it himself! When his article comes out, you'll see, and you'll accept mine for publication.

But my misfortunes are trivial compared to those borne by Boris Pavlovich Belousov, who was fated in 1951 to make one of the major discoveries of the 20th century—to record the oscillation process in chemical reactions. The article devoted to the discovery received a negative response. The reviewer knew precisely that this could not be. And in the remaining 20 years of his life Belousov was able to publish only a short abstract in a little known anthology, where there apparently were no reviewers. The full text of the article came to light only 11 years after his death. By the way, specialists now cite this work most often.

This calls to mind an old story. In 1824 the French scientist Sadi Carnot published an article on the motive force of fire which long went unnoticed. What is shocking is that the true significance of this article as one of the cornerstones of thermodynamics was revealed to the world by the English physicist William Thompson (also famous as Lord Kelvin), who was born that same year! Just as shocking is the fact that Sadi Carnot published this historical work at his own expense. It seems that

scientists had this opportunity even then. I have no doubt that B. P. Belousov would certainly have taken advantage of it. Regardless what this would have cost him in money, I think that the lost time and effort in the struggle with secret reviewers were much more costly.

So what emerged from the depths of the State Committee for Publishing Houses, Printing Plants and the Book Trade in their "study" of the question of doing away with closed review? The proposal to conceal...the author's name! How? Very simple: send anonymous articles to reviewers. Then why not go one step farther? Publish the article without indicating who wrote it. Especially since there is a precedent for this. Haven't geographic maps and atlases here been published anonymously, like a gift fallen from the sky, rather than the work of specific authors? It's easy to see the ominous prospect behind the absurd proposal. Having seen it, I still asked an associate of the State Committee, "From what will this turn of events save us?" The answer was, "From a direct settling of accounts."

I don't know how often scandals occur at the review stage, and I know only from hearsay of experiences, painful for any author, in which the desire to settle accounts with someone develops and grows. Let's say, first the journal requires the permission of the author's organization and a certificate of examination for the article submitted for publication. The author must make his way through several departments in order to obtain these papers, and the number of signatures he has to collect is determined in the mass of instructions regulating the issuance of the required documents. For example, there may be more than 20 signatures "blessing" an article! Is it really necessary to describe the dramatic scenes that take place all around, since the roles have already been assigned. The author is the supplicant; the boss, the benefactor.

Once, after exhausting the usual approaches in the struggle for the examination certificate (the work contained nothing secret, and the members of the examining commission fully understood this, but the odds were on the side of those against publication), I decided to write directly to Glavlit [Main Administration for Literary Publishing Houses]. To be honest, I didn't expect an answer. But I was wrong. They set up a meeting with me. On the way, I felt exactly as if I were going to meet the Black Knight, eternally hidden beneath his helmet. The conversation was entirely without the formalism that erects insurmountable barriers. In my situation, my interlocutor found nothing new, since he knew that examination certificates, introduced only to preserve state secrets, are used for purposes other than that. People vising the certificates often confuse state and personal interests. To be brief, the topic of conversation unexpectedly turned to the ethics of scientific associates.

I had previously understood that the relationships in an NII [Scientific Research Institute] differed sharply from, let's say, those in a plant or ship. At a plant one shop could hardly have an interest in the idle time of another, and in a ship the interdependence is even stronger. As regards our brother, only once, I recall, did I smell a breeze of brotherhood in Academician A. Skrinskiy's collective at Novosibirsk's Academy city.

In fact it's something else. A neighbor's failure does not distress, but more likely heartens. If they close down your neighbor, perhaps they'll toss more money your way. And what butchery there is when the importance of the topic submitted is defended! What does the evidence amount to? The same goes for publications—how many are there where have they managed to get into print? Sometimes it's quite useful to hold back some article. Not to mention the times when authors of different scientific schools whose well-being directly depends on a rival's lost creative time run into works on the same topic.

So that was the outcome of my Sunday school lesson. By the way, he didn't save my article. It was again considered speculative (this word is particularly popular among "bureaucratic opponents"). The point is this. According to my calculations, the efficiency of incandescent bulbs can be significantly increased—but this is quite contrary to the notions of the very developers of these bulbs, who include, of course, the management of the Illumination Engineering Institute where I was working. So they didn't sign an examination certificate for me out of considerations of pure ambition, to save "the honor of the uniform." Only 12 years later, when the Americans and Japanese had put my idea to practice after arriving at it by other routes, did I hear from my former adversaries, "You were right!" The recognition was as useless as it was late.

So, a scientist's right to publish his work turns out to hang on a major question, whether his organization consents. And if he doesn't work? Let's say he is retired or became an invalid? A good idea can come to a scientists at any age, regardless of his social position. What then—the idea is lost?

"Why is it lost?" objected one of my acquaintances. "There is a simple way to get an idea into print. It has to be given to someone powerful in the world of science, someone who has no trouble getting an examination certificate, not to mention a letter from his organization. And if your "invalid" picks someone honest, he may see his own name among the authors of the published article. You really don't know that young scientists often give their ideas to their bosses for just this reason? The best is to give it to an eminent scientist acting as the editor of the appropriate journal. That's the reliable way!"

One asks, At whose expense are these forced gifts?

Finally, a curious pattern. I discovered it when I looked critically at the long list of my publications. Those which were simpler, a little duller, and had only momentary importance went through easily and smoothly. Like

butterflies that live only for a day, they flitted onto the pages of magazines, accompanied by the approving opinions of reviewers and editorial board members, but were quickly forgotten. Who cares about last year's snow? It fell, lay, and melted. My colleagues cite articles which collected a stack of rejection notices and had a hard time getting into print more and more as the time since their publication passes.

A conclusion suggests itself. Is he happy who is conquered by ideas well-known, but daring to "dig deeper," that run into lack of understanding and unwillingness to understand, in any case, with considerable resistance? But what does one add to world knowledge by traveling on a smooth path? The real scientist is always a fighter. He battles boldly for his idea. There is nothing and no one for him to hide behind. Therefor the proposal on anonymous articles put forth by the State Committee for Publishing Houses, Printing Plants, and the Book Trade makes no sense for him. If we call a spade a spade, then instead of an open struggle, some impersonal and quite unromantic battle with windmills is being proposed. I believe that the time has come, so to speak, to unmask secret reviewers. To see which ones have maintained an interest in science and rejoice at its growth, who are concerned about their own career advancement; who is capable of evaluating grains of new knowledge, and who is lazy and incompetent.

In this time of decisive changes in our society, it seems appropriate to ask, Can't the scientists in this country allow themselves to have journals, or at least departments in existing journals, free from any review? If we are concerned about creating a legal government, shouldn't we provide for clearly developed author's rights for scientists? The creative force of their minds should be wholly directed toward solving scientific problems, not finding ways to avoid being caught in the millstones of windmills.

Foreign Currency Shortage Limits Technical Exchanges

18140195b Moscow KOMSOMOLSKAYA PRAVDA in Russian 18 Feb 89 p 3

[Article by I. Viktorova, winner of the Lenin Komsomol Prize, and M. Isichenko, member of the All-Union Komsomol Central Committee: "'Brains'...Are Not for Sale"]

[Text] Who will deny the necessity and importance of the participation of our country in the international division of labor? No one. Is it possible to imagine scientific and technical progress in one country without the extensive exchange of information and ideas? Hardly. Nevertheless, in matters of scientific and technical exchange we have not gone far as compared with the times of "hostile capitalist encirclement."

In prewar times the tradition of the nearly mandatory practical study of young scientists at leading laboratories of the world after the dissertation defense existed at the Academy of Sciences. And, probably, it is not by chance that works, which were completed precisely during this period, account for all the Nobel Prizes to Soviet scientists. What became of this tradition?

Now priority in the development of economic, scientific, and technical relations is being given to the socialist countries. Such contacts are the basic means of implementing the Sodruzhestvo Program. In the 3 years, which have passed since the signing of this program, many meetings with foreign partners, conferences, seminars, and exhibitions have been held, several joint developments have also appeared. Nevertheless, for the present one cannot talk about any substantial economic impact or about the extensive involvement of young people in international contacts.

One of the most important channels of the exchange of scientific and technical information is participation in international scientific meetings. Many applications from young scientists with the request to organize trips to international scientific conferences and congresses, long-term practical studies, and so forth are being received by the All-Union Komsomol Central Committee and the Sputnik Bureau of International Youth Tourism. However, the resources of the central Komsomol organs and the Bureau of International Youth Tourism are limited. The lack of any foreign currency is a serious obstacle, and for this reason preference for the present is being given to exchanges on a noncurrency basis. But what is to be done, if we, as in many respects a developing country, are not always of interest to a partner that we need?

Here we are proceeding to another problem. There exists (it is unknown, true, in which legislative acts) a ban on "the sale of brains," that is, on the temporary job placement of Soviet citizens at foreign firms, scientific centers, and so forth. They usually give as the reason for such a ban the intolerability of the squandering of national "intellectual property." But are "brains," in contrast to petroleum, really not renewable resources? Moreover, our "intellectual guest workers," who have worked some time abroad, will bring with them to the homeland ideas and skills—the same "level of world standards," which constantly escapes us. The experience of many socialist and developing countries should also attract our attention in this matter. Incidentally, the problem of practical studies of this sort comes under the category of political problems, it is connected with the legislation on the procedure of entering and leaving the country, which is now being improved, and we are hoping for an active position of our future people's deputies.

But still the greatest problem of the development of international scientific and technical ties of young people is the lack of assets. One should also not expect that with the development of cost accounting in science sectorial and academic institutes will begin to actively finance international youth contacts that do not promise, as a rule, quick cost recovery. Therefore, the question of the establishment of an all-union Fund of International Scientific and Technical Ties of Young People is on the agenda. This fund should accomplish the following tasks:

— the financing of visits by young scientists and specialists to foreign firms and laboratories for the conducting of joint research and development, as well as for practical studies;

— organizational and financial assistance in the holding of international scientific meetings, the sending of young Soviet scientists to conferences, symposiums, and so on, which are being held abroad, the bringing in on preferential terms of young scientists from socialist and developing countries for measures being implemented in the USSR;

— the organization of temporary international creative collectives and joint ventures on the basis of the competition of ideas;

— the promotion of the exchange of scientific and technical information, including the access of Soviet specialists to international computer networks and data banks;

— the promotion of student exchanges;

— participation in the public-state system of the identification and support of young gifted people;

— the struggle for peace and ecological survival through the scientific and technical cooperation of young people.

The fund should be managed on the basis of democratic principles. Representatives of the sponsors and prominent scientists, who display an active concern for young people, should be on the board of the fund.

We appeal to the Academy of Sciences, the State Committee for Science and Technology, the State Committee for Public Education, and the most important ministries and departments of the country to support the initiative of the establishment and to be along with the All-Union Komsomol Central Committee among the founders and sponsors of the fund.

We call upon leading scientists and political figures of our country, international organizations, and all those, to whom the idea of the internationalization of scientific and technical progress is dear, to give assistance to the fund, starting with moral support and ending with personal monetary donations.

S&T Center Studies Soviet Competitiveness in World Markets

18140195a Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 Mar 89 p 5

[Article by M. Smirnov: "A Pilot in the Chaos of the Market"]

[Text] Soviet industry and science have an enormous potential, which, unfortunately, is not always used. This trend is also being observed during the changeover to the new form of cooperation. On the one hand, there are few proposals from foreign firms on the establishment of joint ventures on the basis of science-intensive technology. On the other, the Soviet founders often do not offer enough of a contribution of their own scientific and technical developmentsto to the designs of a joint works . When investing assets in a joint venture, the Soviet organization should have the guarantee that it will produce a new, high-quality product not only for the USSR, but also for the international market. It is irrational to orient production toward a product, which has become obsolete and in the immediate future will disappear from the foreign market. The provision of assistance in the evaluation of the promise and technical level of a product is one of the directions of the work of the Interlab Center of Scientific and Technical Information. The simple study of commodities of the foreign market cannot serve as a reference point for the determination of the technical level, toward which the products of a future enterprise should be oriented. The patent studies, which experts of the Center perform quickly and in a high-quality manner, will help the enterprise determine its coordinates in the present technical world. Such an approach has a number of essential advantages. First, the opportunity appears to study the product at the stage of the idea, that is, the market of the future, second, to determine the patent cleanness of the proposed product, and, third, to identify and patent one's own inventions.

At first the initiative to establish joint ventures came mainly from foreign firms. Now it is up to Soviet organizations, which should themselves seek partners and interest them in cooperation. However, it is not that easy to do this. Soviet specialists often do not know what firms are working in the necessary directions and what products they are releasing on the foreign market. Here the agency will also provide serious skilled assistance. In accordance with the description of the product, the experts will find specific firms, will make their addresses available, and will indicate the countries in which they have affiliates. At present the greatest efforts are being exerted in seeking foreign partners for organizations that work in the area of instrument making, computer technology, optics, vacuum equipment, low-temperature equipment, and science-intensive technologies. For these directions the Center tries to find a partner in the shortest time, which, as a rule, does not exceed 1-2 months.

The address of the Interlab agency is: 125212, Moscow-212, SERF.

LaSSR Social Science Institutes Unable To Support CP Leadership

18140200 Riga IZVESTIYA AKADEMII NAUKA LATVIYSKOY SSR in Russian No 12, Dec 88 pp 3-16

[Report on meeting of Member of the Politburo of the CPSU Central Committee and Secretary of the CPSU Central Committee V. A. Medvedev with members of the Presidium of the Latvian SSR Academy of Sciences and a group of Latvian scientists on 14 November 1988 at the Latvian SSR Academy of Sciences (LATINFORM): "Increase the Prestige and Role of Science. The Meeting of V. A. Medvedev With Scientists"; statements published from an abridged verbatim report]

[Text] The discussion at the meeting of Member of the Politburo of the CPSU Central Committee and Secretary of the CPSU Central Committee V.A. Medvedev with members of the Presidium of the Latvian SSR Academy of Sciences and a group of scientists, which took place on the morning of 14 November in the tall building of the academy, concerned the problems of restructuring in science, the difficulties and prospects of its development, and the accomplishment of the tasks that face social scientists in our revolutionary times. Comrades Ya.Ya. Vagris, A.V. Gorbunov, I.Ya. Kezbers, V.P. Solovev, and S.V. Zukul also participated in it.

President of the Latvian SSR Academy of Sciences and Academician of the USSR Academy of Sciences B.A. Purin opened the meeting. He told about the state of academic science in the republic and, in particular, stressed: With respect to a number of items our academy has achieved a good level both in the country and in the world. Of the questions, which we are grouping with restructuring questions, it is possible to name the following ones: we have determined the basic priority directions; we are exerting great efforts for the development of the social base of the Academy of Sciences; we have established an engineering and technological center so that it would be possible to introduce the results of research more quickly in the national economy.

Certain difficulties exist with the establishment of the social base. Very good assets—total capital investments of more than 45 million rubles—were allotted for it. But, unfortunately, only half of the assets will be assimilated by the end of the five-year plan. This is a consequence of the same policy, when our economy was deformed, when forces and assets did not remain for the development of science.

The social problem is very serious. The attitude toward scientists is same as toward unskilled workers. The average wage at the Academy of Sciences is less than the average republic wage.

Now the question of greater independence of the republic is arising. What would I like to suggest in this connection? Here new institutes should be organized in the future, but this is a very complicated procedure. We believe that the conclusion of an authoritative expert commission, on the basis of which the republic Council of Ministers could make a decision, would be sufficient for the establishment of a new institute.

The second question is the question of the financing of science, which, unfortunately, has been worked on for a long time. The recently adopted decree also does not give satisfaction. As for our specialized design and technological bureaus, we are trying to bring their financing and economic activity closer to cooperative terms, but so that in so doing they would work on our, the academy's tasks.

I would also like to touch upon several problems, which concern the entire republic, and to dwell on the role of scientists of the academy in solving these problems. I will begin with criticism and self-criticism. The Academy of Sciences has a large department of social institutes—economics, history, philosophy and law, language and literature.

Our institutes proved to be unprepared for the situation which has formed today. If, say, the People's Front advances a specific program and this program might have certain deviations from Marxist views, our social scientists should have voiced their opinion on each such point. This would help the party leadership to size up events more correctly. Hence, theory is lagging here. This is a great misfortune of our social scientists and, I believe, the fault of the presidium, which did not aim the social institutions in time at the solution of these problems.

I can cite examples. Several points of the program of the People's Front evoke at best a controversial attitude. And even the overall orientation of this program does. According to this program the Soviet Union is not a unified multinational state, but a union of states on a treaty basis. This is the political point. We go farther. The economic point—the establishment of full cost accounting, including its own currency. In the social question—all office work in Latvian, its own military combined units, and so on. And when we examine the program as a whole, a question arises: But does this not lead to a state of secession of the republic? They reply to me that I have an incorrect understanding. And all the same such trends exist. If logically all this is implemented, then little remains to finally put a full stop.

If all republics were to proceed according to such a model, then a question arises: What will we have as a result? Will we be a unified multinational state or will we not have it? This is a very serious theoretical question, and I am not voicing here a definitive point of view, it is necessary to study it seriously. Today it is necessary to have a clear Marxist position.

We, the social scientists of the Academy of Sciences, in this respect are in debt. It must be said that our party organization is also not engaging in the elaboration of an active party position.

The discussion of amendments to the Constitution is now under way. Who is the first to speak in this matter? Naturally, the People's Front. And this is not bad. But the party should be in the vanguard and explain its position.

Yesterday (13 November—editor's note) Chairman of the People's Front D. Ivans spoke on the program "Labvakar." I thought that after the report in PRAVDA with explanations he would report the repeal of the decision of the Duma with respect to the new draft laws. For a convincing answer was given to the majority of questions that were raised in it. But, unfortunately, this did not happen. It is this that is alarming.

Here, perhaps, there is also an error of the CPSU Central Committee. When the draft of the amendments was published, it was necessary to furnish such an article at once. There emerged among the people questions, to which they did not get an answer in good time.

Once again I stress. We should have the critical substantiation of specific decisions from a Marxist standpoint, should openly fight for it, and not wait for what will come of the position of the People's Front. We should take an active position in life on the basis of the decisions of the 19th All-Union Party Conference.

Academician of the Latvian SSR Academy of Sciences V.A. Shteynberg: Many questions, which are connected with the development of our republic, worry me as a citizen, as a scientist, and as a communist. I believe everyone will agree with me that instead of consolidation, which we need, the process of disunification, including with respect to nationality, is occurring. The trends of chauvinism and nationalism not only are not weakening, but are also intensifying. And I do not know how we will succeed in holding a unifying congress on 10 December. The role of some personnel on television and in several other media, for example, in AVOTS (RODNIK), is unenviable.

Simply everyone today is quoting Lenin! But our communists have forgotten one idea of Lenin, that each nation should wage the struggle against nationalism in its own midst. Today a heated argument is taking place here: the Russian-language press is accusing the Latvians, the other side is accusing the Russians. If this trend develops further, the problem will never be solved. Many communists, who have forgotten that they belong to the Communist Party and that there are the By-Laws and Program, which lay down specific requirements for every communist, whatever position he holds, are to blame for this. It turned out that today communists are not striving to speak out against the trend, even if these are negative tendencies. They are the least active part in the People's Front, in the Interfront, and in other organizations. Why, then, are the communists not being made to answer? I believe that both in the republic Communist Party Central Committee and in the CPSU Central Committee they have neglected or are neglecting their role in the supervision of ideological processes. And this is causing concern for the party.

Rallies, the gathering of signatures, and pickets are continuing in the republic. Yesterday I heard D. Ivans on "Labvakar." He had already promised a month ahead an entire series of measures of this sort. A question arises: When will we begin the direct accomplishment of vital tasks, including ecological tasks?

The second question. The food program. I am doubting more and more often whether we will be able in the allotted time to fulfill the food program. At the highest level they like to cite foreign experience. I also want to cite it. All the countries, which are short of products, buy more of them. We obstinately do not want to do this.

In the Baltic republics prior to restructuring there was coffee, but today there is none. They will tell me that this is not meat and not bread. But this is arousing the annoyance of people, there was always coffee here. Why can we not solve this problem?

And the last question. The comrades know about the disastrous state of the social sciences, starting with Moscow and ending with the union republics. The reasons are well known. But such a campaign against the social sciences as today has never been observed in our country. Everyone considers himself a specialist in this field. With respect to physics and mathematics not everyone will decide to speak out, but with respect to the social sciences they will by all means. And Moscow television is setting the tone. The writer Polyakov, who, like an oracle, takes the liberty of giving recommendations on how the socialist system should be developed, appeared 3-4 days ago. An interesting writer, let him engage in what he can do. And there are tens of such examples.

Until we shift from the talk that it is necessary to develop the social sciences to assistance to social scientists, we will hardly make headway. There is a winged phrase: facts are the air of scientists. This is correct not only for the natural sciences. We have been saying for 3-4 years now: facts are needed, materials, statistical data are needed. But the matter has not been seen through. I, for example, have twice addressed to the USSR Committee for State Security the request to give me some archival materials on problems of my scientific research. The second time I appealed to the first deputy chairman of the USSR KGB, 4 months passed, but I even did not receive a reply. Do glasnost and restructuring not concern this organization?

Ya.Ya. Veysh, acting director of the Institute of Philosophy and Law of the Latvian SSR Academy of Sciences: It seems to me that our republic party organization under the leadership of Comrade Pugo acted very properly when it paid attention to what is happening around. And it seems to me that our party erred too much when, without having looked into the situation, issued general instructions. I cannot agree that the party is lagging behind. The party should, having weighed everything, act so that the decisions made by it would be the correct ones. Therefore, I want the new leadership to work in the same spirit.

But now, just as before, the social sciences are servants of politicians. They demand from us all the time: that is necessary, this is necessary. Prostitution has appeared, it is necessary to provide some materials on prostitution. If there is something else, again provide materials. I think it would be proper if society and the party would paid attention to the social sciences and would give them the opportunity to work in peace. This is not a fire service, which can perform one topical political assignment or another. The social sciences should work for the long-term future. A social scientist is formed over decades. And when much life experience already exists, then he can make a large contribution to culture, and through culture to politics. He can be useful to his people, society, and party in all the questions, which Comrade Purin correctly posed here, that is, which concern the essence of socialism and our state system, and in all other questions. But I am opposed to quick solutions again being required of us.

As for the Constitution, we still also remain at a loss. The Constitution is something unshakable. If it is adopted, it remains for a long time. People should know that this is our Fundamental Law for the distant future. True, we can change it. Let us suppose that amendments to the American constitution, which reflect the topic of the day, are adopted. But the situation, when we, having now adopted the Fundamental Law, will then revise this law, is somehow unacceptable. One must not make a new Constitution every 10 years!

V.A. Medvedev: It is a question not of the adoption of a new Constitution, but precisely of amendments, which are necessary for the settlement of current matters and without which we cannot make progress.

P.V. Gulyan, deputy director of the Institute of Economics of the Latvian SSR Academy of Sciences: I am dwelling only on what concerns my work in the field of economics—the development and distribution of productive forces. Of course, the questions of the migration of the population, which are now worrying many people and are the stumbling block of the events that are occurring in the republic, stem from here. I agree with the assessment that you gave during the meeting with creative workers. I can testify: there is no intentional increase of the population influx. For a quarter of a century now I have been in charge of studies on the prospects of the development of productive forces and in connection with this have been in contact with the corresponding organs in Moscow. These questions, of course, should be settled at a different level, first of all by the leadership of our republic. It should have regulated the process so that the proper proportions would have been preserved. The gate was open. Here there are also the oversights of the CPSU Central Committee of that period. It was necessary to deal with this, then we would not have the situation that we have today.

M.S. Gorbachev has repeatedly said: We must form our relations so that a person would feel at home everywhere. The phrase is very correct and acceptable. But when we try its fit on such republics as ours, where there are 1.3 million Latvians, and it is no great trouble to move 1 million people across the country, then the local inhabitant no longer feels at home. When developing the national economy, it is necessary to be concerned first of all that the local inhabitant would also feel at home. It is necessary to do this by intensification, the increase of labor productivity, and the stimulation of natural growth. It is also necessary to take some administrative steps, for example, on the granting of housing to discharged officers of the Soviet Army.

Then the speaker talked about the pollution of the Gulf of Riga. The construction of treatment facilities is only the easing of the process, and not its radical solution. It is necessary not simply to limit the growth of Riga, but also to take steps on reducing the size of the population of the city. Hence the question of the location of the facilities that already exist here. It worries me that the leadership of the republic is somehow treating this very calmly.

We are talking a lot about priorities. But for an economist it is absolutely clear that we will not solve problems with priorities, because there are no resources.

Here everything is now very canonized. I sometimes say in joking that it is Yuris Podniyeks who made the movie "Is It Easy to Be Young?". It is still necessary to make the movie "Is It Easy to Be the Council of Ministers or the State Planning Committee of the Republic?", which everyone is now cursing. But they decide in Moscow even what fines to impose on us.

The speaker criticized the practice of drawing up the plans of the development and distribution of productive forces for the country as a whole, by regions, and by sectors. Great efforts are spent on this, since the plans consist of a large number of indicators. But problem issues are essentially absent.

Vice President of the Latvian SSR Academy of Sciences and Academician of the Latvian SSR Academy of Sciences E.A. Yakubaytis: It seems to me that the comrades in Moscow picture very poorly what is happening here, and hence there are very many troubles. It must be said that we party members are also not taking an active

position. And it is time no longer to pay attention, but to act. Today we have the program of the People's Front, the program of the Interfront is appearing. Tens of programs of various societies are appearing. It seems to me that now the main task is to formulate a program of the party organization of the republic and to fight for the fulfillment of this program. To take everything good that the People's Front has proposed, to take the positive features from the other fronts. But the atmosphere should be unified, and the party should be at the head.

At one time it was believed that science should pave the ways to scientific and technical progress, but for this it is necessary to give scientists more freedom. There were special decrees about the fact that more rights had been granted to us than to industry. Now restructuring is taking place as if on another planet. Cooperatives have appeared, new rights for socialist enterprises have been given. But what about science?

We are in a most difficult position. The outflow of engineering personnel is taking place. And any most intelligent scientist cannot do anything without a laboratory, without the organization of an experiment. A web of instructions remains, while wherever you go, everywhere there are financiers who are keeping these instructions handy.

For example, a candidate of sciences can work at a plant design bureau, but but it is impossible at an institute.

V.A. Medvedev: How is it impossible? He can.

E.A. Yakubaytis: Certainly, but it is impossible to pay him as a candidate, while at the Riga State Electrical Equipment Plant imeni V.I. Lenin it is possible.

The latest decree of the Council of Ministers on new forms of the remuneration of labor, in accordance with which we can determine the bonuses upon completion of the scientific work. But we, especially social scientists, have themes that last 10-15 years. So, will people live without bonuses for 10-15 years?

The speaker also illustrated his idea with other examples and proposed to give science the same rights as cooperatives. If there are any doubts, let us conduct an experiment. We will select several institutes in various places—in Latvia and in other republics. But it seems to me that there is not any risk here.

Corresponding Member of the USSR Academy of Sciences A.K. Malmeyster, honorary member of the Presidium of the Latvian SSR Academy of Sciences: Our People's Front is stressing very much the peculiarities of the Latvian people and Latvia. I want to dwell on this.

In 1940, a revolution occurred here. Who remembers this now? Everyone remembers 1941, that there was a deformed socialist society there. The 1940 revolution was bloodless owing to the diplomatic intervention of the Soviet Union.

Now they say: What kind of revolution is this, if it is bloodless? Under German occupation they wiped out all the Soviet activists to the man. While whoever had time to evacuate, joined the Latvian division. How many of them remained? After the war they were sent as party organizers to the volosts. Who remembers them? They are no more, bandits wiped all of them out. Now this is a peculiarity of the Latvian people.

Our revolution is younger than in Russia, and our "countras" are also younger. They are better armed and more active than the Russian emigration and counterrevolution. Here is a peculiarity of Latvia.

They are accusing our historians of the fact that they do not support creative unions that pursue their own line. Our historians have held their ground and are continuing to cover the partisan war, underground activity, and so on. But it still necessary to cover the critical moment, the revolution in Latvia. And to identify the forces that were offended at that time.

In Latvia there is no counterrevolution in the old understanding. But in the opinion of the scientist, there are people, who have given in to the agitation of the descendants of the offended people and to western propaganda.

R.A. Kukayn, academician secretary of the Chemical and Biological Sciences Department of the Latvian SSR Academy of Sciences: A very complicated ecological situation has formed in the republic. The reasons are clear—these are deformations in our policy and the strategy of the development of the national economy, as well as the allocation of assets for nature protection measures according to the remainder and even "zero" principle. The ecological situation, which has formed in Latvia, is today also a political situation.

Everyone knows that a very good decree on the radical improvement of the protection of nature has been promulgated. But how is it being implemented? The committees for the protection of nature—both union and republic—have been placed under such conditions that they cannot fulfill their tasks. The control functions thus far have been reserved for ministries. According to the principle: let the goat loose in the garden.

For health and hygiene reasons we cannot swim in the sea. We have very bad drinking water which is the cause of a large number of infectious diseases. We decided to establish jointly with the State Committee for the Protection of Nature a center for the study and elaboration of scientific problems of ecology in the republic. We have been establishing it for nearly a year. Because, it turns out, we ourselves in Latvia cannot establish such a

center, permission from the appropriate central institutions is needed without fail. This is a terribly difficult means, but it is necessary to settle very quickly the "burning" question. This speaks in favor of decentralization.

I cannot but speak about the People's Front. This movement is a profoundly popular one. The lack of understanding of the slogans and program, which have been advanced by the People's Front of Latvia, testifies that our thinking today has not yet changed. I also could not immediately understand much. As a deputy of the USSR Supreme Soviet the voters invited me to their conference of the People's Front in Dobele. If assemblies of the People's Front took place that way at our center, those, who today have a negative attitude toward the People's Front of Latvia, would change their position. There they spoke from very correct positions, which I completely share as a communist. It is possible to clarify everything very well precisely in a dialog.

R.A. Kukayn expressed concern with the fact that the communists of the academy are mainly elderly people, since obstacles stand all the time in the way of the intelligentsia into the party: at our institute we can admit to the party only one person in 2 years. Today young people, who want to work for restructuring, understand that we cannot go on living as we have lived so far, and are going where they can go—to the People's Front. To all appearances, this is, indeed, the best part of the intelligentsia of young and middle age.

I want to recall that the concept "constitution" comes from the Latin word "constancy." I believe that we published too hastily the amendments to the Constitution.

Academician of the Latvian SSR Academy of Sciences A.A. Kalnynsh, director of the Institute of Economics of the Latvian SSR State Agroindustrial Committee: In our republic the economy was developed very rapidly, but at the same time agriculture was not developed. Our industry turned out to be too metal-consuming and power-consuming, it is not particularly oriented toward export. About 52 percent of all industry of the republic is concentrated in Riga. Again deformation. As a result there are the mechanical growth of the population, discontent with the supply of housing, and an ecological crisis. We see a way out of this situation in the decentralization of the economy, the economic independence of the national economy of the republic, or, as they say, economic sovereignty, which is a synonym of cost accounting. The first models of cost accounting of the republic have been formulated and published. Now we are working on a second version. We will discuss it with the people, then will submit it through the Council of Ministers to the session of the republic Supreme Soviet, in order then to go to union organs. There is the assumption that by the end of next year the republic will change over to regional cost accounting. Of course, this must be done jointly with Estonia, Latvia, and, preferably, Belorussia.

The speaker voiced the opinion that it is more expedient to draft a new Constitution as a whole and to begin in so doing with the constitutions of the republics in common directions.

The question of the changeover of the republic to cost accounting will also result in certain changes of the system of the organization of science and education. The integration of academic science, science of higher educational institutions, and science of applied institutes should occur.

If we speak about the program of the People's Front, it must be considered that so far there have been no optimum and all-encompassing programs. If during the drafting of the legal section lawyers of the university worked on the organizing committee, why did the Institute of Philosophy and Law not take part? I believe as a communist that the more actively we get involved in the People's Front, the more correctly this movement will proceed. And the more scientific personnel there are there, the better it will be for everyone, and particularly for us.

I support the view of First Secretary of the Kirovskiy Rayon Party Committee M. Rukmane: party work has lagged where the Interfront has emerged. Academician R. Kukayn spoke about Dobele. Indeed, in rural rayons the People's Front will help specific matters. In Riga the situation is more complex. Therefore, we must be in this movement, so that it would take the correct course.

Corresponding Member of the Latvian SSR Academy of Sciences A.Ya. Blinkena, deputy director of the Institute of Language and Literature of the Latvian SSR Academy of Sciences: Language is not only a means of communication, but also the soul of the people. And I would say that this is the life of the people. And that is why all peoples—both large and small—treat this question with such pain and with such sensitivity. Every language and every nation are a pearl in the garland of mankind. And we all have the responsibility that all nations, all peoples, and all languages would live and develop.

The Latvian language is one of the oldest languages, which has preserved many peculiarities of the Indo-European parent language. Therefore, it is necessary for research in comparative historical linguistics. Linguists throughout the world are studying it. And the Latvian language is a developed literary language, which is capable of being used in all public functions and which has old written traditions. But in recent years in connection with the economic situation, with the rapid development of industry, and with the continuous mechanical influx of inhabitants from other republics—not only manpower, but also retirees and even criminals—the Latvian

people have become a minority in our republic. And, thus, assimilation threatens them, the disappearance of the Latvian language threatens them.

The Latvian language has already disappeared from many spheres. And although here, as in all the Soviet republics, bilingualism officially exists, it is very nonuniform and actually one-sided, inasmuch as 80 percent of the inhabitants are fluent in Russian, but only 25 percent of the inhabitants, who speak other languages, are fluent in Latvian. And, consequently, Russian is used more extensively, and it threats to supplant the Latvian language. We should preserve our language and its functions. And even in science it is an unoffical language. Because dissertations are approved by the higher certification commission only when they are written in Russian. The Presidium of the republic Supreme Soviet has established a working group for the formulation of proposals on the status of the Latvian language.

Both the pain and the stand of people were seen strikingly clearly from the reaction of the people. The working group received more than 9,000 letters, in which 350,000 people confirmed their wish that the Latvian language would become the state language in our republic. Representatives of the most different social and age groups were among these people. And it was especially pleasing that very many authors of the letters are non-Latvians. The decree to approve the status of the Latvian language as the state language, which was adopted by the session of the Supreme Soviet, was received by society with much satisfaction. Moreover, very many non-Latvians also understand the pain of the Latvian people, are sympathetic, and now are voluntarily trying to study Latvian.

And if they have now begun to do this, I believe that it is not as a result of administrative pressure. They simply realize the necessity of studying the Latvian language and the need to have a common means of communication for cooperation. We were able to be convinced of this on the latest telecast of "Vards," on which there was a survey of very many random passers-by on the street. And all of them without exception confirmed that it is necessary to study the Latvian language, that this is necessary for our republic. And now, when a commission is working on a law on the languages of the republic, I believe that this will be the fulfillment of Lenin's principle. He wrote that it is necessary to introduce the strictest rules with respect to the use of the national language in the national republics. Here, he asserted, a detailed code, which only the nationals, who live in one republic, can formulate in any way successfully, will be required.

V.A. Medvedev: But do you know that Lenin opposed a state language?

A.Ya. Blinkena: I do, but that was in 1914 and pertained to tsarist Russia. We, too, want to establish such a code, and it will provide guarantees of the preservation and development of the sound functioning of the Latvian language. Not for the abasement and not for the infringement of the rights of other languages.

V.A. Medvedev: This is the primary thing.

A.Ya. Blinkena: I also believe that it is the primary thing.

Another suggestion. For the restructuring of the management of science. On behalf of all Latvian scientists I would like to ask that the Latvian language be given the right to be a full-fledged language of science and that dissertations in national languages be allowed to be approved.

V.A. Medvedev: Such suggestions have also been made. But the majority of suggestions were of others. Because where is the boundary, at which it is necessary to stop? You know better than I do how many we have—100 or 140 nationalities, national languages, and national literatures. What is one to do with the nationality, in which there is a very small number of people? What is one to do with the defense of such dissertations? If one is to be principled, one must then go all the way and permit a defense in any language. I want to say that there is no distrust here. Let us think about how to do this in order not to encroach upon any language and any literature.

I.K. Vitols, professor of the Latvian State University: In physics there is the method of extrapolation. Data are gathered by years, they are analyzed, and on the basis of this a forecast for the future is made. To what do the data on national questions testify? What if one calculates and by years plots, say, the ratios of nationalities in Riga, then plots the data on the use of language? We can construct an object graph. Some uncertainty results from these data: Latvian culture will disappear either in 50 years or in 150 years. I believe that this survival process governs the political situation in the republic. And not Voice of America.

Now the most important thing is to assure the Latvian people that they will not perish. Therefore, I very much recommend to you as a member of the Politburo to give guarantees of the existence of the people. I am convinced that in this case the national question will be resolved.

After the war all Latvians received Russians very well, nearly all Latvians speak Russian well. And at work—at higher educational institutions, at factories—the personal relations between them are normal. Difficulty arises when we go into the street.

As for the Constitution, there is the one apprehension that it secures the right of authority of ministries, which throughout the Union and in all cities do not take into account the local conditions, including in Latvia, pollute nature, and so on. They are not capable of taking local

conditions into account. That is why in the Constitution guarantees should be given that the local authorities throughout the Union, including in the Latvian SSR, have power.

Academician of the Latvian SSR Academy of Sciences Ya.P. Stradyn: Republic and union science are inseparable, our ties are diverse and insoluble. But today it is necessary to speak about another thing. About the role of the party and about the situation that is forming here.

Although I am a nonparty person, I believe precisely in the party and in its mind, it is very good that the party is paying attention to the people. This is an axiom: the party should know the dreams of the people.

It is impossible to separate what we now see in the Baltic republics from the general processes of democratization, which are taking place throughout the Soviet Union, but here they are taking place somewhat more rapidly. Here they have acquired a national color. I have talked with leading scientists of Moscow, Leningrad, Kazan, Tbilisi, and Kiev, where there is also a complex situation. This is restructuring from below. One must not ignore it, it is necessary, on the contrary, to guide it. This is very important.

In the Baltic republics the belief in restructuring and in M.S. Gorbachev is very strong, the restructuring movement is strong, but at the same time the conservative trends, which developed here after 1959, when the party organization of Latvia was smashed in the spirit, it can be said, of Nina Andreyeva, are strong.

I do not agree that interethnic relations became strained after the congress of the People's Front, although there were great costs there. I attended the congress, although I am not a member of the People's Front. The journals NOVYY MIR and ZNAMYA, on the one hand, and NASH SOVREMENNIK and MOLODAYA GVARDIYA, on the other, are being published. Fierce disputes are taking place on their pages. But in Latvia to a certain degree a national feature is being superimposed on this diversity of opinions. We not so much converse in different languages as we think in different languages: in old and new categories. There are also the ill-information, lack of information, and most often the misinformation of the Russian-speaking population about events in the republic and its history and culture. The People's Front to a significant degree reflects the sentiments of the people, we cannot lose sight of this.

SOVETSKAYA LATVIYA and other newspapers, which are published in Russian, form the opinions of a portion of society. It is necessary to approach this with particular responsibility, because they go to an all-union audience. They also form to some degree a negative idea of Latvians. The talk about the Baltic republics and about restructuring should be continued in light of the preparation of the Plenum on national relations and in light of the entire subsequent policy of the CPSU. This factor is of not only local importance.

We support the present leadership of our republic, I would not want to say that the party is lagging, it is pursuing a sensible policy in the republic.

Ya.F. Freymanis, head of a laboratory of the Institute of Organic Synthesis of the Latvian SSR Academy of Sciences: I will venture to speak, first, about ecology and, second, about politics. Both on behalf of the organizing committee of the future union of scientists and behalf of the People's Front of Latvia. You, perhaps, do not know that at scientific institutes up to a fourth of the associates belong to the People's Front of Latvia. I am a member of the board of the People's Front and am responsible there for questions of ecology.

Our republic has become a range for experiments of all-union departments, they are not heeding our signals and absolutely do not understand us. The entire republic opposed the plan of the construction of a nuclear electric power plant in Latvia, even the government did. We are receiving an arrogant letter, in which it is stated that there will be a nuclear electric power plant in Latvia.

The reaction to the amendments to the Constitution is natural. We regard them as a means of strengthening the authority of departments. This does not leave us any opportunity to settle these matters ourselves. The People's Front also rejects this program as a whole.

At present the People's Front of Latvia unites approximately 120,000 inhabitants of Latvia of all nationalities, the number of sympathizers is far greater. Approximately a fifth of the People's Front of Latvia is CPSU members, all strata of the population are represented in the People's Front of Latvia. At present 500,000 signatures against the adoption of the amendments to the Constitution have been collected in the republic. Soon these signatures will be in Moscow.

A conference of the People's Front of Latvia with the boards of the front of Estonia and the Lithuanian movement for restructuring was held a few days ago. Our opinions are united, and they are negative. Our scientist-experts believe that these draft laws are not so much in the spirit of the party conference as they are aimed at the establishment of supercentralized authority, in which there will no longer be a place for the sovereignty of small peoples.

At the end of my statement I state on behalf of the organizing committee of the union of scientists and on behalf of the People's Front of Latvia our support for the present leadership of the republic, first of all Comrades Vagris and Gorbunov. I believe that this leadership has

done much for the emancipation of our spiritual life following the 27th CPSU Congress. This is a leadership, which is capable of a dialog and is capable of constructive work.

At the end of my statement, Vadim Andreyevich, I have the honor to turn over to you the documents of all three fronts of the Baltic Republics.

In conclusion V.A. Medvedev addressed the meeting:

I want first of all to stress the profound connection of restructuring, which was begun on the initiative of our party and its new leadership after the April 1985 Plenum, with our science. Of course, many specific questions in the area of the organization of science still have to be settled and discussed, but I should say one thing. From the very start, from the first steps of the activity of the present leadership of the Central Committee close contact with science and reliance on science were an invariable principle of it and a guiding rule. In all elaborations—economic, scientific and technical, and general political—much consulting with the Academy of Sciences and the scientific aktiv is being conducted, the best minds, it can be said, of our Soviet society are being enlisted.

Practical steps are also being taken to increase the prestige and role of science in the development of our country. Much attention is being displayed toward the Academy of Science and toward the entire system of academic institutions, including the republic academies, regional scientific centers, and so on. A most serious document on the development of the basic sciences is being prepared.

Many comrades were at the general assembly of the Academy of Sciences, heard the evaluations or, more precisely, the self-evaluations of the state of our basic sciences, and can judge how pressing and urgent a task this is. We have begun to lose the traditionally strong positions of Soviet science in the world in many directions of the most important scientific and technical programs and in various directions of the development of the country and economic and social development. I would also like to stress the great role of science in the processes, which are occurring in the republic, and the necessity of increasing this role. I think that this concerns all the problems without exception, which are now at the center of attention of your community. The questions of the national composition of the republic and of its regulation are being discussed so heatedly and passionately in all collectives.

It would be incorrect to believe that any intentional, carefully thought out and formulated policy of decreasing the share of the Latvian population of the republic has been pursued. This is chaos, this is a process which was uncontrollable. While departmental interest, it did its job. And in the absence of the monitoring of this process here is what kind of results it yielded. Both in the republic and, probably, in the Union as a whole. But what is the solution? There is, in my opinion, one solution. It is the increase of the scientific, technical, and economic organizational level of the national economy of the republic. The more resolute shift to the path of intensification, the increase of labor productivity.

I believe that a need for any declarations concerning the fact that we are for the preservation of the Latvian nation is simply not arising. There is no such question. Here comrades spoke about the fact that it is necessary that there be assurance. Why are any confirmations needed? All this depends on our work. The principled attitude toward the Latvian nation, as well as toward other nations, is entirely clear. It stems from our policy, especially under the conditions of restructuring. We are for the development and for the blossoming of all the nations and peoples of our country. Are there really any doubts here? But in the practical sphere, in economic and social policy it is necessary to take this more completely into account. And now great opportunities are appearing for this, in the sense of the broadening of the rights of the republics, in the sense of the transfer of state power to the Soviets. The supervision of the party will be carried out not by interference in the decisions of state organs, but through the communists who work in soviet and other organs.

It seems to me that in this connection the role of science is increasing very vigorously. And what is being done here on the increase of the practical yield of science, including academic science, for the development of the national economy and the increase of its skills and scientific and technical level, all this is very important and all this merits the most ardent and most resolute support.

Before the social sciences and before economic science there is an enormous field of activity, which is connected both with efficient forms of the organization of the economic process and with the determination of the best solutions, which concern the distribution of productive forces, the specialization of the republic, and the prospects of its further development. I sense that work is under way here. And it is necessary to do this, it is necessary to do this without fail. Including for practice, for ideology, and for the performance of political work. Because an illusory, naive notion, which is also reflected in several statements, appears at times. For example, the statement that the economy and its structure have to be reformed so that it would work primarily for the needs of the republic.

Comrades, this is trivial. Exclusiveness is a complete contradiction to the present trends of economic development, which is refuted by world practice. Within not only small, but also large states. It is necessary to unite, it is necessary to integrate. It is necessary to follow the line of the division of labor. It is another matter that the division of labor should be most effective and most expedient, so that it would involve the least expenditures

with respect to deliveries, with respect to raw material questions, and with respect to questions of manpower resources. But there is no where to escape from the problems of integration and from the problems of the determination of the optimum place in the union division of labor. Here, too, our economists and political economists must take a more active position and clarify these questions so that unfounded illusions and even naive things would not appear.

Linguistic and cultural problems. I agree completely here with the comrades, and I have said repeatedly about this that these are the most sensitive questions, in the settlement of which the maximum attention is necessary. And it is necessary to proceed from our fundamental aims, which reflect the essence of the Leninist approach. We can argue about quotations and the interpretation of quotations, but the essence is such that there should not be any administrative pressure in this matter. The complete meeting of the linguistic, spiritual, and cultural needs of people—that is our policy. On its basis it is also necessary to settle the matter in practice.

They are talking about the declaration of the national language of the republic as the state language. We have such experience in the Transcaucasian republics. There is nothing unacceptable in it, of course, but it is necessary that this would be correctly interpreted. Why did I mention Lenin's attitude toward this question? Not the letter, but the spirit of this attitude is important. There exists here the danger of coercion and administrative pressure. If this were not allowed, as it is not allowed both in Georgia and in the other Transcaucasian republics, then there will be, quite possibly, nothing bad in such a settlement of the question. It is important to keep an eye on the essence of the matter. And on the observance of the general orientation of our policy in this respect.

Legal science. I have already had occasion to voice my opinion and to talk probably about 20 times on the drafts of the amendments to the Constitution and the new election law in the most different situations, starting with a conversation with scientists and executives of legal services and law enforcement organs and ending with meetings and conversations on the streets. I should tell you that I have not heard a single argument to support the fact the drafts, which have now been submitted for discussion, contradict or in some way deviate from the spirit and letter of the decisions of the 19th conference. They do not exist. This is a legend. All the questions, which are posed in the drafts that concern the structure of state organs—the introduction of the Congress of People's Deputies, the change of the status and the nature of the work of the Supreme Soviet, the change of the functions of the Presidium of the Supreme Soviet, the introduction of the position of Chairman of the Supreme Soviet—are in complete conformity with the decisions of the 19th party conference. Not to mention the election processes, the democratization of the election process, and the functioning of new organs of state power. For some reason no one speaks about this during the discussion, in documents, and in the resolutions that are being adopted. For everything is secured there, which was spoken about at the party conference: elections among multicandidate constituencies, the inclusion on ballots, as a rule, of two and more candidates. The increase of the status of deputies, the transformation of the Supreme Soviet into a permanent constitutional democratic elected organ, and the monitoring on its part of the activity of executive organs. That is, all the democratic norms, which were spoken about at the conference and concern this group of questions, are completely incorporated there.

With just one exception, which concerns the election of people's judges. Yesterday even in Yekabpils this question was being discussed.

At the conference it was stated and recorded that judges would be elected at a higher level, so as to ensure their independence of the Soviets, at the level of which they work. Our legislators considered it necessary to change the approach to this question and to propose a different formula: the election of people's judges by the Soviet, at the level of which they work. The reasoning is very simple: it is impossible to proceed from the former notion of the role of the Soviet. If the Soviet will be a sovereign organ, which is established entirely on democratic bases and under the control of the people and deputies, there are no grounds, they say, not to trust it in the election of courts and judges.

I, for example, believe, and I have spoken about this, that this deviation from the decisions of the conference is unfounded. It is necessary to do some more work so that the Soviets would be truly sovereign organs, and, perhaps, to return to this question. Here is the only deviation from the decisions of the 19th conference. There are no more exceptions.

It is difficult to say by what such a violent reaction in the three Baltic republics is explained. But it is alarming that this reaction appeared literally a few days after the publication of the two drafts, when no explanatory and no commentary work had yet been performed. People had not yet had time to read carefully and discuss everything, the first resolutions are already appearing.

At first everything was depicted and perceived as if it is a question of a new Constitution. It is a question not of a draft of a new Constitution. But it is a question only of amendments to those sections of the Constitution, which interpret the questions that are connected with the structure of new state organs, the highest state organs of our form of government, and the election process. Only that. The remaining questions for the present are not being touch upon, all this will be done, including the questions of the nation-state system, the division of rights and powers between the Union and the republics, and so on.

Now everything is as if beginning to become clear, especially after the publication of the report on the meeting of the Politburo and the decree of the Central Committee on the preparation of the Plenum on interethnic relations. Then they say: So, will the Constitution have to be revised several times, will amendments have to be made several times? Yes, this will have to be done. Such is our period. Such is the process of restructuring, that one will have to return several times to amendments to the Constitution on some questions or others, which, as our process of elaborating and explaining these problems takes place, will each be submitted for national discussion. It is much work, serious work. It will drag on, perhaps, for an entire year, it will be necessary with respect to the republics to complete it before the elections to the Supreme Soviets of the republics, which take place in the fall. But you will not avoid this. Such are our times, which are stormy and involve the emergence of newer and newer problems and the necessity of their solution. To dump everything in one heap, you know, is an unthinkable thing.

Moreover, I should say that the necessity of the overall revision of the Constitution will probably appear at the end of this process. Because many provisions, starting with the 1977 preamble, have also become obsolete there. What of it, such is life, this will have to be done.

Is this a sign of some disrespect for our Constitution? Why, no. This is simply a pressing need precisely because we respect it and regard it as the Basic Law of our life. One will have to return and to make amendments as the subsequent questions of legislative activity are elaborated. Yes, I should say that amendments have been made to the Constitution quite often. Even during the period of stagnation. This is the usual process of legislative activity. For that we also elect the highest organs of state power, competent organs, on whose shoulders constitutional activity also rests, so that they would work and work, I do not see anything unusual in this. They say it is too little time. But these questions were also discussed earlier. And other questions are already, so to speak, propping us up in order somehow not to drag this out too long in time.

Our historical science. Many questions have been asked. Especially on the streets, on the part of young people, with respect to the events of 1939, 1940, and the war. The historical truth should be fully restored, the corresponding archival materials, which pertain to all the trials, should also be analyzed. At the center this work is proceeding intensively.

Here it is just now attracting attention. This work was performed not by historians and specialists, but on a purely emotional wave. The review of historical events and several important assessments both for the Union and for the republic is beginning. But when you begin to have a discussion, it turns out that the people you are talking with are absolutely ignorant people. Our historians need somehow to join more actively in these processes. To join in so as not to revise with all their might the fundamental assessments of our history. To speak about the distortions and the mistakes, which were allowed. But not to allow it that the objectively natural content of the historical process would spill out under the flag of the criticism of these deviations of Stalin's methods from legality.

The role of our historians and historical science in this respect is exceptionally great and responsible. It seems to me that they must leave the "trenches" more actively and join in this process, in this struggle. As to archival materials, steps will be taken, at any rate at the center. You know that now a new publication of the CPSU Central Committee, in which the information on the current activity of the Central Committee and the Politburo will be expanded significantly and archival materials, which concern the history of the party and the history of our country, and materials from the personal archives of figures of various periods will be systematically published, is being undertaken.

In conclusion I would like to speak in response to the statements heard here in address of the leadership of the republic, the Central Committee, the government, and other organs. I heard these statements during all the past days. Moreover, very insistent ones, which somehow are highly charging the situation. Apparently, it seems to somebody that a certain danger exists here, and they are linking this all but with my arrival. I assure you that the leadership of the CPSU Central Committee has the same positive attitude, full confidence, and the hope that your leaders will be able in this difficult situation to conduct matters in such a way that the role of the party organization of the republic and the communists of Latvia would increase. So that the influence on the development of the sociopolitical situation in the necessary direction would increase. That is, in such a direction, which supports the entire useful initiative of the people and young people, which conforms to restructuring, but, at the same time, to oppose more actively the negative extremist displays. They have been spoken about, they are occurring.

In this spirit we will conduct business with the leadership of the Central Committee of the republic Communist Party and with the leadership of the republic: and in the future will strive to see to it that restructuring in your republic would steadily advance for the strengthening of our socialist country.

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Problems of Reorganization in Kazakh Academy of Sciences

18140203 Alma-Ata VESTNIK AKADEMII NAUK KAZAKHSKOY SSR in Russian No 12, Dec 88 pp 3-21

[Article under the rubric "In the Presidium of the Kazakh SSR Academy of Sciences": "On the Tasks on the Restructuring of Academic Science and the Increase of Its Yield"]

[Text] The expanded meeting of the Presidium of the Kazakh SSR Academy of Sciences, in the work of which members of the republic government headed by Chairman of the Kazakh SSR Council of Ministers N.A. Nazarbayev took part, was held on 21 October 1988. Executives of large scientific production associations, directors of academic and sectorial institutes, and executives of construction organizations were also invited to the meeting.

President of the Kazakh SSR Academy of Sciences and Academician of the Kazakh SSR Academy of Sciences U.M. Sultangazin, in opening the meeting, stressed that such a representative meeting, when members of the academy and executives of scientific institutions have the opportunity to discuss our common problems and to bring the theoretical concepts of the academy close to the real economy of the republic, was being held for the first time.

The question "On the Tasks of the Restructuring of Academic Science and the Increase of Its Yield" was submitted for consideration by the Presidium of the Kazakh SSR Academy of Sciences.

President of the Kazakh SSR Academy of Sciences and Academician of the Kazakh SSR Academy of Sciences U.M. Sultangazin delivered the report at the meeting of the Presidium.

The basic theme of our discussion today, U.M. Sultangazin noted, is the objective and subjective factors, which are checking the progressive movement of the academy, the ways and means of overcoming them, the tasks of the Presidium and scientists, and the possible assistance of the republic in their accomplishment. Our specific requests are set forth in a special memorandum, which was sent to the Central Committee and the Council of Ministers; therefore, the discussion will now concern quite specific requests. Our appeal to party and soviet organs are not the fruit of dependent sentiments, but the result of long intense work of the Presidium on the analysis of the present level of research and the state of the personnel potential and the scientific and technical and experimental bases and on the ascertainment of the reserves and possibilities of the sharp increase of the efficiency of the work of the academy by the 13th Five-Year Plan. In the area of the steps outlined by us on the improvement of the use of the scientific potential, for the accomplishment of the tasks, which are top priority and important for the national economy, everything is more or less clear; it is a question only of them beginning to work.

Having repeatedly revised the structure and themes of research in connection with the changeover to the new conditions of financing and with allowance made for the remarks of the commissions of the Party Control Committee attached to the CPSU Central Committee and the Presidium of the USSR Academy of Sciences, the academy should still perform much work in this direction. We are actively cooperating now with the USSR Academy of Sciences on questions of the involvement of our academy in statewide programs of basic research. We also have to clearly find our position with the state order of the republic. But for the accomplishment of everything planned it is necessary to have not only personnel, but also material and technical supply. The analysis of the present state of the material and technical base of the academy shows that although the capital-labor ratio per employee in science increased from 8,000 rubles in 1970 to 16,000 rubles in 1988, while the total financing increased from 24.6 million rubles to 45.3 million rubles, including from 3.5 million rubles to 7.7 million rubles a year in spending on the acquisition of equipment and instruments, the Kazakh Academy of Sciences has constantly held 10th-13th place among the republic academies, while lagging seriously behind the average indicators for the country. All this convinces us that it seems impossible without radical steps to ensure a leap in the increase of the efficiency of the work of the Academy of Sciences. Assessing the situation realistically, the Presidium, the departments, and the institutes are taking the most vigorous steps on the more complete and efficient use of the available single-design equipment and computer hardware by its multishift operation and the establishment of collective-use centers. The questions of the more complete utilization of the pilot bases of the Chemical and Technological Sciences Department and the institutes of nuclear physics and mining are being worked on. However, the steps being taken are obviously insufficient, and they will not ensure the necessary leap in the increase of the efficiency of work.

Capital construction is causing particular anxiety. All the decrees of the Kazakh CP Central Committee and the Kazakh SSR Council of Ministers on the development of the Academy of Sciences in this area, which have been adopted in the last 10 years, remain unfulfilled. In particular, the amount of capital investments during 1981-1985 in practice was reduced to one-half as compared with the established amount, while all the facilities for the sectors "Health Care" and "Culture and Education" thus far have simply not been built. Since 1984 the questions on the allotment of a parcel and the construction of the only holiday hotel of the Academy of Sciences (with space for 250 people) on Lake Issyk-Kul have not been settled. In conformity with the decree of the Bureau of the Kazakh CP Central Committee and the Kazakh SSR Council of Ministers of 2 June 1987 during the

current five-year plan only 7 of the 26 urgently needed facilities, including 2 of the 8 facilities of experimental bases and social, cultural, and personal services, should be built. However, even these minimum planned amounts of capital investments are being assimilated unsatisfactorily: in 1987—52 percent, including construction and installation work—67.3 percent, in 8 months of 1988—respectively 85 and 65 percent. Why did such a situation form?

At the meeting of the Presidium in March 1987 the causes, which depend on the academy, were revealed and specific steps on their elimination were defined. These are the sharp reduction (to one-fifth to one-fourth) during the recent period of the amounts of design work of the general contractor, the All-Union State Planning and Scientific Research Institute for the Designing of Scientific Research Institutes, Laboratories, and Scientific Centers of the USSR Academy of Sciences and the Academies of Sciences of the Union Republics; the mistakes made by the Capital Construction Administration when planning work and the dates of the delivery of component equipment; the lax development of the material base of the repair and construction section.

One of the main causes is the fact that among construction workers in "the table of ranks" science both held and holds one of the last places, since the construction of its facilities is monitored least of all.

Along with what has been stated the condition of a number of existing facilities is also causing great anxiety, since the weak repair and construction section of the academy, which is now also being diverted for the construction of housing, is not capable of ensuring the necessary current, especially capital, repair. The extremely unsatisfactory condition of the buildings of the Central Scientific Library and the Nauka Publishing House and of the Museum of Archeology and serious defects in the main building of the academy are making the situation catastrophic. Moreover, an urgent need for additional areas for the Central Scientific Library, the printing house of the Nauka Publishing House, and the Museum of Archeology is being felt. Inasmuch as the construction or expansion of these facilities is also not envisaged for the 13th Five-Year Plan, the prompt assistance in this matter of the Council of Ministers is also needed.

To get a general idea of the provision of our institutes with production areas, it is sufficient to say that of the 31 institutes 6 have an area per worker of up to 5 square meters, 16 have up to 10 square meters, 6 have up to 20 square meters, and only 3 have a little more than 20 square meters. In conformity with the procedural instructions on the planning and forecasting of capital construction at the academies of sciences of the union republics the norm per worker for the natural sciences should come to 30 square meters and for the social sciences, 20 square meters. With respect to these indicators we also hold one of the last places. In connection with this the academy is asking the Council of Ministers to commission the Kazakh SSR State Planning Committee to examine a second time the list of priority facilities of the Kazakh SSR Academy of Sciences with allowance made for the actually formed situation for the purpose of bringing the date of their construction closer and increasing the amounts of capital investments and limits for construction and installation work for the 13th and 14th Five-Year Plans by 1.5- to 2-fold. It is also necessary to give the academy real assistance in the one-time allocation of machine tools, construction equipment, and motor transport for the strengthening of the construction base of the repair and construction section for the purpose of increasing the amounts of its work by threefold.

At present the efficiency of the use of equipment, especially single-design equipment, and the state of repair and metrological inspection do not meet the needs of the academy. The collective use of expensive equipment thus far has mainly be spoken about, but the organization of an academywide center of the collective use of instruments is progressing extremely slowly, just as are the computer record keeping and monitoring of the movement of equipment. The Presidium is taking every step so that in the immediate future these and other questions would be settled unequivocally. The provision of instruments per worker here comes to 8,500 rubles, which is less than the average union norms, and is at the level of 13th place among the union republics. We posed this question very pointedly to the Presidium of the USSR Academy of Sciences, since the Central Supply Administration of the USSR Academy of Sciences is filling only 18-25 percent of the orders of the academy, while currency starting last year ceased to be allocated altogether. The assignment of the Presidium of the USSR Academy of Sciences to the Central Supply Administration of the USSR Academy of Sciences is instilling very wary hopes; since May we have not been able even jointly to determine the possibilities of our supply with specific, priority instruments and units. In this connection we are asking the republic government to help in this matter as well.

As of 1 January 1988, the value of scientific equipment and means of measurements comes to 85.3 million rubles, including about 60 million rubles in expensive equipment, 1.7 million rubles in uninstalled equipment, and 1.1 million rubles in unused equipment. The reasons for this are the untimely sale and writing off of obsolete equipment and delays with repair due to the lack of a departmental repair base. An understanding with the Siberian Affiliate of the Interatominstrument International Economic Association on the opening at the Kazakh SSR Academy of Sciences of a division of this organization has now been reached.

In speaking about the disastrous situation with pilot experimental bases and material and technical supply, it is necessary to stress that without a change of the situation the accomplishment of the tasks posed for us

lacks the most necessary thing—a basis. The academy is often criticized for a low efficiency of work not in general (with allowance made for the unused and unrealized possibilities), but in a mandatory comparison with the other republic academies. The comparison of just economic indicators and the number of concluded license agreements and sold patents without the number of scientific personnel, the availability of pilot production bases, special design bureaus, and computer centers, and the provision with instruments and units not only distorts the actual picture, but also makes the notion of the activity of our own academy incorrect. Here we are not belittling in the least the achievements of our colleagues from the fraternal republics, but, on the contrary, are actively studying and are trying to use here their know-how. Modern science is not only the most high-paid sector of the national economy, but also the most capital-intensive sector. Without the proper investment of assets in it, it is unrealistic to expect a large return. Moreover, when comparing republic academies, it is also necessary to know the specific nature of the development at them of some directions of science or others. When speaking about our difficulties with the material and technical base, we clearly understand that without skilled personnel, who are devoted to the cause of science, it is impossible to raise the level of research to a new, higher stage. Here no less difficult tasks face us, and we also hope for assistance on the part of the Council of Ministers.

On 7 April 1988, there were 56 academicians and 92 corresponding members at the Kazakh SSR Academy of Sciences, at present there are 42 academicians and 82 corresponding members, of them only 25 academicians and 46 corresponding members of the Kazakh SSR Academy of Sciences work at institutions of the academy. Of the 42 academicians 13 are over the age of 75 (of them 6 work at the academy), of the 82 corresponding members 20 are. Among the members of the academy only one is under 50, while more than 60 percent are 60-80 years old. The average age of doctors of sciences is 56.7, while 34 percent are of retirement age. These are alarming symptoms which testify that the staff of the academy should be replenished with fresh, young personnel, while the training of doctors, especially in the priority directions, should be stepped up drastically. The Personnel Program, which is being drawn up, envisages all these things. In conformity with this program by 1995 it is planned to train 1,100 candidates and 180 doctors of sciences.

Further, President of the Academy of Sciences U.M. Sultangazin stated several wishes with regard to questions of the management of science. The scientists of the Academy of Sciences cannot bear a grudge against the lack of attention on the part of the Central Committee and the Council of Ministers of the republic. Other academies can hardly boast that in 10 years special decrees on the activity of the Academy of Sciences were adopted in the Kazakh SSR.

However, the effectiveness of the decrees being adopted and the level of their implementation are not conducive to the increase of the role of the Academy of Sciences in the acceleration of scientific and technical progress, to the development and strengthening of its material and technical base and social sphere, and to the priority establishment of pilot experimental works. Today's discussion should help to place the emphases, to specify more clearly and delimit the tasks, and to name each person responsible for specific sections. We will probably hear much criticism meant for us with regard to the low effectiveness of the works being introduced and the small number of major proposals, which have been included in the plan of the economic and social development of the republic. In this regard it is necessary to cite the example of the implementation of the decree of the Central Committee and the Kazakh SSR Council of Ministers, in conformity with which the academy jointly with interested ministries and departments was charged in a 3-month period to make an evaluation of previously completed works for the purpose of their implementation, while the Kazakh SSR State Planning Committee was charged to give assistance in the performance of this work and to ensure the inclusion of the completed developments in the State Plan. The academy performed much work, but in connection with the arisen differences, especially with the Agroindustrial Committee, turned for support to the Science and Technology Department of the State Planning Committee. But, unfortunately, only one work got into the plan of the republic. It is clear that the process of introduction is a complex and multilevel one, especially in connection with the reorganization of industry and the changeover to self-financing and cost recovery, but nevertheless not only scientists should be engaged in introduction, inasmuch as this does not give them anything except enormous trouble.

The republic Council of Ministers made the remark that realistic, active actions on getting previously completed scientific research works to enterprises or other users are not being taken on the part of the Presidium of the Kazakh SSR Academy of Sciences. As is known, institutes perform all works already at the stage of pilot and especially pilot industrial tests at specific enterprises, which without the consent of ministries do not have the right to include them even in their own plan. Therefore, it is unclear what even more realistic and more active steps than those, which the Presidium implemented, can be taken and why scientists should be more interested in this than ministries and the State Planning Committee, which is responsible for the scientific and technical level of the sectors of the national economy.

Another example. On 19 May 1988, the question of the state of patent and license work and steps on its improvement, which is very important not only for the academy, but also for the republic as a whole, was considered at a meeting of the Presidium of the Kazakh SSR Council of Ministers. It was noted that of the 220 scientific organizations of the republic only 16 organizations are carrying

out the patenting of inventions abroad, while only 4 are selling licenses. Due to the lack of results of pilot industrial tests and their assimilation in production 103 of the 180 inventions, which were proposed for patenting in 1987, were rejected. All this also pertains to the academy, where in contrast to the Ministry of Higher and Secondary Specialized Education there is no special design bureau and especially no pilot plant. After the meeting the academy made a detailed analysis of its developments and compiled a report on inventions, which are ready for introduction and include 40 proposals. But thus far neither the State Planning Committee nor the Council of Ministers has needed them. The possibilities of the academy on this level are the previous ones and without the intervention of directive organs matters will remain at the same level and will be new grounds for criticism. Of these works let us name just one—"The Continuous Vacuum Process of Obtaining C-000 Lead in Combination With the Preliminary Removal of Bismuth by the Pyrometallurgical Method," the novelty of which is confirmed by eight inventor's certificates and four patents (Belgium, England, the FRG, and Australia). The refining process, which was proposed by our metallurgists, makes it possible to carry out the large-tonnage production of pure lead with the simultaneous decrease of the cost to one-twentieth to one-fifteenth. However, the industrial unit, which operated at the Chimkent Lead Plant, has been dismantled. The subsequent fate of this work does not interest anyone, except the authors. The cited examples show that the mechanism of the management of scientific and technical progress in the republic requires substantial improvement. And here our efforts should be united.

Today science is going through a critical period, especially our Academy of Sciences, inasmuch as during a little more than the past 2 years it has been criticized more than during the other 40 years of its existence. The criticism addressed to the academy at the 16th Kazakh CP Congress entailed the checking of the activity of its three largest institutes by the republic Committee of People's Control with the corresponding organizational conclusions. The statement of central newspapers, the long work of the commission of the Party Control Commission attached to the CPSU Central Committee, then the arrival of a commission of scientists of the USSR Academy of Sciences, the preparation for the discussion of these materials at a meeting of the Presidium of the USSR Academy of Sciences (May 1988), the publication of a decree of the Central Committee and the republic Council of Ministers (June 1987)—all this kept the leadership of the academy under constant pressure, and all this took place at the same time as the changeover to the new procedure of financing, in which the necessity of revising the structure and themes was also stipulated. Thus, the leadership of the Academy of Sciences had the opportunity to reinterpret the experience of past years and to elaborate new approaches in specific matters with allowance made for the real, critical situation with the provision of production areas, facilities of the pilot experimental base, instruments, and computer hardware, as well as the state of personnel. The main conclusion of all the listed documents is the loss of a fundamental nature and the decrease of the pace of development of academic science. And although on the scale of the country, as was stressed at the 19th All-Union Party Conference, a pronounced lag of Soviet science in a number of most important directions is being noted, we are not seeking in this vindication for ourselves. Practical experience has shown that one must not economize on basic science, one must not pose for it unfounded demands—to yield an immediate impact—and one must not approach it from the position of sectorial or plant science. Any lag in basic science adversely affects the development of sectorial science and the scientific and technical potential of the country in general. All this was especially characteristic of our academy, at which given the lack of a pilot experimental base and, consequently, the poor preparation of works for assimilation the institutes strove to divert scientific forces for the settlement of special problems of practice and introduced more by even agreeing to forgery and the padding of figures. And it is very gratifying that, starting in 1989, the indicator of the economic effectiveness from the realization of scientific developments is finally being eliminated from the state reporting form. This once again underscores the fact that it is not only improper, but even dangerous to measure the effectiveness and the level of basic science by the economic impact. Life itself confirms today that only purposeful fundamental developments are an effective means of increasing the practical yield of science. Therefore, we also began restructuring precisely with the specification of the basic research that should undergo priority development. If with respect to these items we find support and complete mutual understanding with the State Planning Committee and the Council of Ministers, we should resign ourselves to a decrease of the so-called economic impact and the number of works being introduced. In science quantity is never equivalent to quality, and revolutionizing technologies and developments are not devised annually. Here following the experience of the Ukrainian and other academies we should clearly formulate the priorities and make qualitative changes in their planning. This work should become a function of not academic, but republic scientific councils for problems. Such councils or other organs should give a critical assessment of the state and prospects of the development of this research, prepare sound forecasts, and determine the priorities even within problems. Only on such a basis will the formulation of programs be an effective and promising form of the organization of science.

The Presidium and the departments should use directive principles more actively in the planning of themes, as the USSR Academy of Sciences now does for the country. Only this will make it possible to combine our small forces and negligible amount of assets for the solution of fundamentally important problems. As the first step the Presidium ordered the departments to concentrate

efforts around three technical and natural science problems: the complete and efficient use of mineral raw materials, ecology, and machine science and control processes, and two problems in the area of the social sciences: questions of national and interethnic relations, questions of sociology. In the immediate future we expect the same kind of suggestions from each department, moreover, for all three levels—the republic, the academy, and the department. We have been working actively for a year with the USSR Academy of Sciences on the inclusion of our developments in the statewide programs of basic research at the level of the Presidium and the departments and are not yet doing anything on the specification of the list of regional problems—the state order of the republic and, consequently, the coordination of themes with the tasks that face Kazakhstan. Unfortunately, restructuring for the most part is taking place here at the level of the Presidium and, in part, the bureaus of the departments. Up to now the departments have been waiting for something and have not placed the basic emphasis on the sharp intensification of the work directly at institutes, for the purpose of obtaining profound results and formulating truly revolutionary recommendations.

The work on the compiling of forecasts has not found development here, which has already been done by our colleagues from the Ukrainian Academy of Sciences. The Council for the Study of Productive Forces of the Ukrainian SSR Academy of Sciences jointly with problem commissions of the Interdepartmental Scientific Council for Scientific, Technical, and Socioeconomic Forecasting attached to the Presidium and the State Planning Committee of the Ukraine and with their head organizations formulated forecasts of the development of the 10 most important sectors of the national economy, while the departments with the assistance of temporary working commissions under the supervision of leading scientists submitted forecasts of the development of the most important directions of science to 2000. We need to begin such work quickly so that when drawing up drafts of the plans of scientific research work for the 13th Five-Year Plan we would have a clear idea of the prospects of the development of the sectors of the national economy and the corresponding directions of science. In contrast to the Council for the Study of Productive Forces of the Ukrainian SSR Academy of Sciences our Council for Coordination is keeping aloof of this most important work, while the Institute of Economics—the head developer of the comprehensive program of scientific and technical progress to 2000—is engaging in the formulation of programs itself, without the active involvement of the scientific community at large. Our Interdepartmental Council of the State Planning Committee and the Academy of Sciences is also not a generator of new ideas and forms of the organization of science. The program as a preplanning document exists in itself, while the planning of science proceeds, as before, from the lowermost strata themselves. It is necessary, apparently, to examine the progress of the formulation and, what is the main thing, the implementation of the provisions of the program at the highest level for the purpose of elaborating mandatory acts of its uses when compiling forecasts and specific programs in the most important directions of the development of science and production. Among the priority tasks of this level is the elaboration of a forecast on ecology in connection with the tense ecological situation that has formed in the republic, within which a number of intersectorial scientific and technical programs like the Fertility, Reclamation, Adaptation, and others programs should be formulated. The Biological Sciences, Chemical and Technological Sciences, and Earth Sciences Departments need to begin the formulation of the republic Ecology Program, a territorial comprehensive system of environmental protection, research on the evaluation of the socioeconomic consequences of the change of the natural environment, and the legal aspects of the formation of ecological awareness and the stepping up of the promotion of scientific proposals.

The Nature Protection Department of the Institute of Botany of the Kazakh SSR Academy of Sciences has performed some work on the inclusion of a number of developments of scientists in the draft being prepared of the USSR State Program on the Long-Term Comprehensive Program of Environmental Protection and the Efficient Use of Natural Resources. But it is unquestionable that the republic should have its own detailed program, which should be considered following the experience of Moldavia and other republics at a session of the Kazakh SSR Supreme Soviet. One of the deputy chairmen of the Council of Ministers should supervise this program, just as the program of the complete use of mineral resources, while at the academy it is necessary to organize the corresponding republic centers.

Such are the main plans of work of the Kazakh SSR Academy of Sciences, which have been suggested by life and the experience of other academies, and the general views on the increase of the fundamentality of research at the academy. In this connection President of the Academy of Sciences U.M. Sultangazin once again stressed that, when carrying over the priority directions from decree to decree as one of the main tasks of the academy, the Central Committee and the Council of Ministers to some extent are missing one of the basic things—the availability of personnel, a base, and the possibility of providing the necessary equipment and units. It has been clear for a long time to everyone in the republic, and the inspecting members of union commissions have noted this quite unequivocally, that the existing material and technical base does not make it possible to maintain at a modern level the experimental research even in the directions, in which our priorities are recognized in the country, and especially to ensure the development of such capital-intensive and instrument-intensive fields of science as electronization, the automation and complete mechanization of technological processes, the development of robots, manipulators, and nontraditional renewable sources of energy, the methods of genetic and cell engineering, and other. The

levels of today and tomorrow and the degree of the supply of science even with domestic instruments are not instilling any optimism in this regard. In this connection it is hardly possible to demand of Kazakh basic science works on the priority research, in which we will never stand up to any competition with the USSR Academy of Sciences and other republic academies, which are working in this direction, but will lose the priorities with respect to already formed developments and developments that are being evolved. Only such a realistic approach with allowance made for the existing and anticipated possibilities of not only the Academy, but also the republic will save us from fruitless criticism and timid attempts at the diversion of assets, which are few as it is, for directions that are obviously too much for us.

All the named and other programs, which promise a large impact in the near or distant future, require considerable expenditures and resources. Here each direction can be successfully developed only in combination with a number of other scientific directions and types of equipment, which we do not have and do not foresee having. Therefore, it is necessary to pose for the academy tasks, which are within its power and are realistic. And if the republic has decided to develop one direction or another, while the academy has for this if only the slightest reserve, it is necessary to approach the matter with all seriousness and full responsibility, agreeing to the necessary manpower and material expenditures. Only in such a case will what has been contemplated not remain a good wish. The main curator of the country—the Presidium of the USSR Academy of Sciences—is aiming us at this, by attaching to one academy or another the directions, in which it can be the leader in the country. A competitive system of the selection of participants is already in operation in redundant directions within the programs of the most important basic research, which are being formulated at the level of the Presidium of the USSR Academy of Sciences and its departments. Therefore, our primary task is to take a worthy place in these programs with respect to the directions or themes, which are characteristic of our academy alone and in which we hold a leading position. Unfortunately, we are poorly informing Moscow and are poorly defending and demonstrating our priorities; therefore, of the 16 directions, which we are proposing to the Presidium of the USSR Academy of Sciences, none is recognized as such. Here, too, apparently, the intervention of the government is necessary. While the fact that the Kazakh Academy of Sciences is devoting significant space in its research to questions of the complete and efficient use of mineral raw materials and to the development on this basis of resource-saving and ecologically clean technologies, should be welcomed in every way, while the work of such a level should be intensified, expanded, and performed more actively and by large forces. Our scientists are now oriented toward this, and in the future we will also give manpower and material preference to this direction. The possibilities of resource-saving technologies are so great that they can change substantially the structure of modern production. And there is no need to spare assets for this, inasmuch as we have an adequate manpower and scientific reserve. This is especially important considering the very tense situation in practically all spheres of the economy. Therefore, it is not by chance that the policy of restricting expenditures on fundamentally new equipment and technology, which do not promise a quick return, is now being pursued in the country, while preference is being given to technologies and methods of the organization of production, which have already demonstrated their effectiveness. Enough serious works, which need duplication and their maintenance at a competitive level, have been proposed here. Inasmuch as it is impossible to develop simultaneously many fields of science and technology, the choice of a means of the most effective distribution of assets and resources is the most difficult task of scientific and technical policy at all levels. Our institutes and departments have been dealing with this for 3 years now, but thus far there are no specific fundamental solutions with allowance made for the urgency of the problems and the existing possibilities. Here, too, the Presidium is prepared to agree to more decisive steps in the implementation of all the internal possibilities and reserves of academic science.

The first to speak during the discussion of the report was Corresponding Member of the Kazakh SSR Academy of Sciences I.O. Baytulin, academician secretary of the Biological Sciences Department and chairman of the United Trade Union Committee of the Kazakh SSR Academy of Sciences, who dwelt on several developments of institutes of the Biological Sciences Department and the significance for the economy of the republic.

As is known, in the textile industry there is a shortage of fine wool. Work on the development of a local wool breed of sheep, for which imported long-wooled rams were crossbred with local fine-wooled sheep, was begun in 1963 by the Institute of Experimental Biology of the Kazakh SSR Academy of Sciences under the supervision of Academician of the Kazakh SSR Academy of Sciences F.M. Mukhamedgaliyev. At present a herd with a total of 120,000 head has been reared. They are being bred at 10 sovkhozes of the republic. Given the solution of the fodder problem the former unprofitable sovkhozes are deriving profits of 1 million rubles each.

I.O. Baytulin stressed that the State Agroindustrial Committee is not attaching proper importance to this problem. But now on the basis of the biotechnological method of transplanting embryos, which was developed at the institute, with the assistance of existing pedigreed stock sovkhozes the opportunity exists to improve the pedigreed qualities of the herd at other sovkhozes as well.

There is another interesting development at the Institute of Molecular Biology and Biochemistry—the preparation phosphatidylinositol. The need for it is large, now our country is purchasing it in Japan at $6,000 a gram.

Moreover, whereas Japanese scientists are obtaining this preparation from the pure kernel of the soybean, our scientists are obtaining it from any waste products of grain (bran, husks). We can produce and sell it ourselves. Now the laboratory has a small staff and is located in unadapted premises. But in the future it is proposed to establish a small biological plant.

At the institutes of the department there are developments on the use of saline soils, maps of the distribution and reserves of medicinal plants have been compiled, there is a technology of the efficient use of pastures, an assortment of decorative plants for the landscaping of cities has been developed, and a technology of growing microalgae for adding to fodders has been proposed. However, all these developments are not being introduced, inasmuch as we do not have our own pilot experimental bases. The academy has the opportunity to use several enterprises as bases and to make model farms out of them. Thus, the arboretum of the Kazakh SSR Ministry of the Forestry Industry, which was turned over to us in the 1980's, has now become a leading pilot model tree nursery. I would like the State Agroindustrial Committee to direct attention to our proposal.

On the ecological situation in Kazakhstan. Our botanical garden is now carrying out the active landscaping of the city of Ekibastuz, has concluded a contract with Tengizgazoneft, and has solved the problem of landscaping the Mangyshlak Peninsula. The question of the Eastern Caspian Sea Region is now very urgent: surveys have shown that along 300 square meters by the Caspian Sea Region 552 water fowl have died; a portion of the territory has been exploited by motor vehicles and the plant cover is hardly being restored. Scientists consider the ecological situation in the Caspian Sea Area catastrophic and are undertaking everything possible for its improvement. But on the part of the state it is also necessary to take fundamental steps.

As chairman of the United Trade Union Committee I want to note that proper attention is not being devoted to questions of social, cultural, and personal services at the Academy of Sciences; there is no sports and rehabilitation complex and no Pioneer camp. We are feeling particularly keenly the lack of dormitories. This year we need to accommodate 200 young scientists following graduate studies, but all the dormitories are overcrowded.

This meeting, I.O. Baytulin noted, should become a turning point in the development of the Kazakh SSR Academy of Sciences.

Corresponding Member of the Kazakh SSR Academy of Sciences G.D. Zakumbayeva, acting director of the Institute of Organic Catalysis and Electrochemistry of the academy, who then spoke, dwelt on the most important tasks of scientists of the Chemical and Technological Sciences Department of the Kazakh SSR Academy of Sciences on the acceleration of scientific and technical progress and the prospects of the development of basic and applied research in the priority directions of chemical science.

The research in the area of fine organic and inorganic synthesis and the development of petroleum-substituting alternative raw materials, fire-retardant foaming coatings, and methods of the single-stage selective implementation of complex chemical processes with the obtaining of the desired products, G.D. Zakumbayeva stressed, holds a large place in the activity of the institutes of the Chemical and Technological Sciences Department.

The practical expedience of the work being performed in the department is confirmed by the participation of the institutes in All-Union Interbranch Scientific Technical Complexes, such as the Katalizator, Avtogennyye protsessy, and other complexes.

The Institute of Organic Catalysis and Electrochemistry in conjunction with other institutes is elaborating the problem of reclaiming secondary raw materials, which is very important for Kazakhstan. Industrial waste is now not being processed and is polluting the environment. Moreover, the waste gases and slags of phosphorus plants are a valuable raw material for the obtaining of benzene, lubricating oils, alcohols, and construction materials.

The basic research of the Institute of Organic Catalysis and Electrochemistry in the area of catalysis and the development of the theory of the prediction of catalytic action made it possible to formulate approaches to the complete reclaiming of the waste of the phosphorus industry. A new technology of obtaining binders from phosphorus sludge, from which harmful impurities (phosphine, hydrogen polysulfide) were removed with the use as a catalyst of the waste of alumina production (Pavlodar) by the mechanocatalytic method, was developed jointly with the NIIstroyproyekt of the USSR Ministry of the Construction Materials Industry and the Scientific Research Institute of Regional Pathology of the Kazakh SSR Ministry of Health. The items, which were produced from purified phosphorus sludge (80 tons), meet the requirements of the All-Union State Standard. The new technology was accepted by the Interdepartmental Commission, which was appointed by an administration of the USSR Ministry of the Construction Materials Industry. Taking into account the priority of the new technology, the expansion of the introduction of the production of unroasted slag binder was recommended.

The Institute of Organic Synthesis and Electrochemistry jointly with sectorial institutes (the Groznyy Scientific Research Institute of Petroleum, the All-Union Scientific Research Institute of Organic Synthesis, the USSR Ministry of the Petroleum Refining and Petrochemical Industry) is developing the recovery of waste gases of phosphorus plants, which at present are being burned in

a flare, by its complete conversion into valuable products: carbon monoxide can be converted into benzene or C_1-C_4 alcohols, which are used as additives which increase the octane rating of motor fuel. This will make it possible to abandon leaded gasoline. The new technology can be used at plants for the obtaining of carbides, metallurgical plants, and other enterprises.

Modern priority directions in the catalytic conversion of the simplest compounds (CO, CO_2, CH_4, H_2O) into products, which are of interest for the national economy (propylene, formaldehyde, alcohols, motor fuel, hydrogen fuel), are being developed at the Institute of Organic Catalysis and Electrochemistry. The study of the problem of obtaining various products of organic synthesis from the simplest substances with the use of solar energy is being proposed.

A number of promising operations on the complete processing of the slags of nonferrous metals are being performed by institutes of the Chemical and Technological Sciences Department of the Kazakh SSR Academy of Sciences. New methods of electrolytic precipitation and reduction and a technique with the use of electric furnaces with a coke filter have been developed and have undergone semi-industrial tests. The proposed methods will ensure the extraction of nonferrous metals, copper pig iron, and waste slag, which is suitable for the production of construction materials.

In 1988, the Tengizneft Petroleum and Gas Production Administration (NGDU) addressed to the Institute of Organic Catalysis and Electrochemistry a request concerning assistance in the production and delivery of 3,000 anode-grounding electrodes, which were developed at the Institute of Organic Catalysis and Electrochemistry.

On the basis of practical recommendations of the Institute of Organic Catalysis and Electrochemistry in 1988 at the Balkhashmed Production Association a test run (200) of anodes like the Magnetan will be produced from secondary iron oxide raw material for enterprises of the gas handling facilities of Alma-Ata. The making of a large or series-produced batch of these anodes is being checked by the lack at the Balkhashmed Production Association of a pilot shop for the output of electrodes. On the basis of what has been presented we are petitioning the Kazakh SSR Council of Ministers for the issuing of a state order to the Balkhashmed Production Association for the production of anode-grounding electrodes for the meeting of the needs of Tengizneftegaz and other organizations of the Caspian Sea Region.

In the Chemical and Technological Sciences Department of the Kazakh SSR Academy of Sciences at present some lag in the development of science is being observed, which is connected primarily with the lack of modern instrument supply. The needed instruments are not produced in our country and currency financing is necessary. At present we are getting out of the instrument crisis with much difficulty owing to the fulfillment of a portion of the work at central institutes of the USSR Academy of Sciences and the Siberian Department of the USSR Academy of Sciences.

Doctor of Technical Sciences Ye.I. Rogov, acting director of the Institute of Mining of the Kazakh SSR Academy of Sciences, noted that as a result of the work done in the process of restructuring the scientific and scientific organizational activity of the Institute of Mining by 1988 two priority directions (instead of the four previously) of research had been formed: the formulation of the theoretical principles of the development of a continuous technology of the underground mining of solid minerals, which is highly adaptive to the rock mass, and the development of the theoretical principles and means of an advanced complex of underground electric mining machines. All the themes of scientific research work of the institute are concentrated (14 themes instead of 32 in 1987) in the 2 indicated directions with the 100-percent protectability of the themes.

Substantial results have been obtained in the area of the formulation of the basic principles of the development of highly adaptive, economical, safe, and ecologically clean technologies of the underground and strip mining of minerals (the ores of ferrous, nonferrous, and precious metals, coal, salts, and others). Great gains were also achieved in the theory of the development and designing of a wide range of mining machines: loading, transport, and drilling machines.

However, many practical outlets for developments of new technologies and especially underground mining machines as self-contained units require without fail design analyses for the development of prototypes of the elements of new technologies, assemblies, machines, and mechanisms and their production and extensive testing at test grounds and under shaft conditions.

The Institute of Mining has a modern laboratory building, a network of laboratories with modern equipment, and a powerful computer center with display complexes, instruments, and equipment for observations and research directly under shaft conditions. However, at the institute the pilot, design, and experimental base is in extremely unsatisfactory condition (the design bureau has 125 square meters, 11 people work there; the machine shop has 900 square meters, 14 people, and 31 units of equipment). In addition to the small size of the staffs and the weakness of the design bureau and pilot shop the latter are inadequately supplied technically, with equipment, machine tools, automation equipment, and other things. The design bureau and the machine shop cannot move substantially the problem of the designing and production of new technologies and models of assemblies, especially robotic complexes with adaptive control. While this means that new TTR's [expansion unknown] with a high technical level will not

get in good time (or at all) to the mining industry. Consequently, the theoretical developments and basic reserves remain an unused potential.

It is possible to illustrate what has been said by the following examples: an electromagnetic hammer drill for the drilling of blast holes in hard rocks, as well as a mine battery-powered trolley dumper, which ensure an increase of labor productivity by approximately twofold, were developed, designed, and produced in laboratories of the Institute of Mining. Moreover, a significant portion of the scientific research work of the Institute of Mining is aimed at the development of technological complexes, which are highly adaptive to the external mining environment (the rock mass) and are based on adaptive robots. Quite specific reserves and several design analyses are available. However, due to the lack of a modern pilot base it is difficult to settle the question of the production of prototypes.

We are setting as our main task in addition to in-depth basic elaborations of the principles of the theory of the technology of mining solid minerals the development of new and highly adaptive technologies, which make it possible to eliminate people from dangerous places—stopes and extraction chambers. But for its accomplishment we need the construction of a scientific pilot experimental base with a design bureau and a plant (on the basis of the Institute of Mining) of the mining geology type; the establishing of a modern test ground for the testing of new technologies, machines, complexes, and assemblies on a parcel of land, which has been allotted in the region of Kapchagay (possibly a collective-use one).

A few words about the use of completed, already tested technologies, assemblies, machines, and so on. The historically established system of introduction in the mining industry—"each developer introduces himself"—is inefficient and does not make fundamental changes of the technologies. Major developments, which require the participation of a number of sectors (the Ministry of Nonferrous Metallurgy, the Ministry of Ferrous Metallurgy, the Ministry of the Coal Industry, the Ministry of Mineral Fertilizer Production), are not finding an outlet, since there is no statewide system of the introduction of completed scientific research works at all the hierarchical levels: the enterprise, the production association of the state industrial association, sectors, and intersectorial levels. It seems that the Council of Ministers and the State Planning Committee of the Kazakh SSR need to assimilate in the shortest time one of the functioning systems of the implementation of completed scientific research works at enterprises of the republic.

Very briefly about the problem of the complete use of mineral raw materials. The unique problem of the complete development and working of mineral deposits and the processing of the rock being extracted, the ashes from heat and electric power plants, and the slags of metallurgical plants is raised in PRAVDA of 20 September 1988 in the editorial "The Wealth of the Depths Is Not Infinite." Our goal, which is concentrated in the two scientific directions indicated above, lies in the development of highly efficient resource-saving, low-waste, and ecologically clean technologies of the extraction of mineral raw materials. An extensive set of studies on the renewal of the optimum technogenic deposits, the recultivation of the disturbed lands, the reworking of the deposits of Kazakhstan, and the substantiation of the use and extraction of reserves of ores of nonferrous metals, which have been grouped by the State Commission for Useful Mineral Resources with substandard reserves, are now being conducted on this level.

The function of the head organization in the area of the development and subsequent working of technogenic deposits has been assigned to the Institute of Mining. Two union coordinating conferences, at which the general prospect and tactics in the area of the theory and practice of technogenic deposits with the mandatory consideration of ecological problems were elaborated, have been held.

Serious substantiations of the introduction of differential requirements for ores of nonferrous metals, based on the conditions of each deposit, have been given at the institute. However, their extensive introduction is a variance with the norms and requirements of the State Commission for Useful Mineral Reserves, the State Committee for the Supervision of Safe Working Practices in Industry and for Mine Supervision, and other departments. Control actions on the part of the Council of Ministers and the State Planning Committee of the republic are also necessary here.

In the area of the development of technogenic deposits in case of the complete use of mineral raw materials the new TTR's also require pilot industrial checking and proving ground tests.

And, finally, very briefly on the distortions in the system of the financing of scientific research work in accordance with economic contracts with enterprises. Starting in 1989 the Kazakh SSR State Planning Committee has established the standard of the wage fund in the total amount of financing at approximately 27 percent. It is absolutely unclear as a result of what scientific or other substantiations this figure appeared. For example, at the Institute of Mining it comes to 56 percent, since the developments in accordance with economic contracts are immediately put to use in the mining industry, which constitutes mainly the wage fund of scientific associates. Using the high tribune and the representativeness of the meeting, Ye.I. Rogov said, I ask that the standard be revised, having left it at the level of not less than 50 percent of the total amount of the economic contracts.

The radical change of the attitude toward the social sciences as the theoretical and ideological foundation of revolutionary restructuring is characteristic of the present stage of restructuring, Corresponding Member of

the Kazakh SSR Academy of Sciences A.K. Koshanov, acting director of the Institute of Economics, emphasized in his statement. In the recent past the technocratic approach to the management of the social sciences substantially belittled the role of Marxist-Leninist theory, while proper attention was not devoted to the development of the humanities. The negative consequences of such an attitude directly showed not only in the lag of the theoretical level of basic research, but also in the substantial lag of the scientific potential of the humanities in the system of the Kazakh SSR Academy of Sciences. The institutes of the Social Sciences Department of the Kazakh SSR Academy of Sciences account for only 6 percent of the total number of scientific associates of the academy (for the USSR Academy of Sciences it is 20 percent). In the last 20 years the size of the department increased by only 8 people, while the number of associates of the Institute of Economics during the 36 years of its existence has remained at the level of 100-110. The same situation is characteristic of the institutes of linguistics, literature and art, and history, archeology, and ethnography, which are the only ones of their sort and are unique in the problems of research.

Now, during the period of revolutionary modernization, by common efforts with the assistance of directive organs it is necessary to get the social sciences over the bad patch. We see the beginning of a positive attitude toward the social sciences on the part of the Presidium of the Kazakh SSR Academy of Sciences, which has been displaying in recent times concern about the affairs of the department, has held a series of conferences at institutes with the participation of President U.M. Sultangazin, and is giving real assistance in the settlement of scientific organizational and other questions. We are placing great hopes in the forthcoming construction of the Social Sciences Center, in which the Presidium of the Kazakh SSR Academy of Sciences is engaged in earnest. Centers for national relations and sociological research have been established with the direct assistance of the Kazakh CP Central Committee. We expect much from the decisions of today's expanded meeting of the Presidium, and we regard the attention, which is being devoted to the academy of sciences on the part of the government of the republic, as a manifestation of the process of the intensification of restructuring. The uniqueness of the process of restructuring, A.K. Koshanov stressed, lies in fact that social practice is outdistancing theory. Our task is to overcome this gap and to be at the level of the requirements of the times. Precisely social practice and the urgent tasks of increasing the efficiency of the economy of the republic have faced scientists with the necessity of elaborating the problems of the changeover of the Kazakh SSR to self-financing and territorial cost accounting. The Council of Ministers and the State Planning Committee have already posed such a task for the Academy of Sciences. We perceive this as a responsible order of the government of the republic and will fulfill it by the common efforts of a number of institutes of the academy, the State Planning Committee, ministries, and departments, as well as with the enlistment of other scientific research institutes and higher educational institutions. A temporary scientific collective will be formed for these purposes. The republic State Planning Committee, which will watch over this work, has promised realistic assistance. The problem of the formation of a integral system of the management of the national economy of the republic is also important. In June of this year we had already raised the question of opening a new scientific direction, but did not receive the appropriate support on the part of the State Committee for Science and Technology. Now with limited forces we are working on a theme on the intersectorial problems of the management of national economic complexes. For the attainment of the level of the scientific elaboration of the problems of the master plan of the management of the national economy of the republic we need realistic, effective assistance by staffs and personnel. Contact is being established with the head institute for the coordination and joint elaboration of the theme, the Institute of Economics of the USSR Academy of Sciences.

A mechanism of the introduction of scientific developments and recommendations has also not been developed for the social sciences, there is actually no feedback on the part of departments. The lack of receptiveness of practice to scientific developments is continuing. At the administrative level they are not binding them to this.

Economists have a just grievance against the head directive and planning organs, A.K. Koshanov believes. They are not being invited and are not being enlisted in the discussion of important economic programs and five-year plans and to conferences at the level of the Council of Ministers and the State Planning Committee. They have been deprived of important materials of mandatory distribution along the lines of directive and planning organs of the republic.

The material base of the humanities institutes of the academy is in deplorable condition—social scientists urgently need computers, copying equipment like the Xerox machine, and a mimeograph machine. The institutes are experiencing an acute shortage of working space. The question of the construction of special premises for the storage of rare manuscripts, folklore collections, and the card file collection on the Kazakh language has not been worked on for years. Obviously, the need has arisen to pose the question of constructing a special building for the Central Scientific Library as well. And, finally, we are awaiting assistance in the opening of the Institute of Archeology. All these, A.K. Koshanov stressed, are urgent needs of the further development of the social sciences in the republic.

S.T. Takezhanov, general director of the State Production Association of the USSR Ministry of Nonferrous Metallurgy, directed attention to the fact that this is the first discussion in the Presidium of the Kazakh SSR

Academy of Sciences on questions that concern the development of the economy of the republic. Concerning the situation today everyone knows that in the country for each ruble of national income 1 ton of mineral resources has to be extracted. It is also well known that mineral resources provide approximately three-fourths of the national income for the country. For us, metallurgists and miners, this work will become promising only when there appears on the Academy of Sciences its own face and when science finds its own place in this matter. Of course, S.T. Takezhanov said, we have a professional connection. But, unfortunately, in mining serious, revolutionary changes are not occurring. This is connected with the fact that a good mining engineering ideology does not exist. The questions raised here are tens of years old. These are both the "portsevoy" discharge and standards, these are complex developments. But then the specific questions, by means of what physical and technical actions we can increase labor productivity in the processes of crushing, drilling, and grinding, are not posed. If we touch upon the question of the depletion of our mineral resources, it is necessary to regard complete use as an economic category. The increase of ore production testifies to an extensive approach to the development of the economy. Today from 40 to 60 percent of the extracted valuables are discarded in dumps, but meanwhile these are construction materials that are ready for use. And it is not necessary to build new concrete and brick plants. We need the waste-free processing of mineral resources, especially ore. Our economic subdivisions either are inventing a new political economy or simply do not want to deal with the concrete economy. It is clear that there is no getting away from the monopolism of sectors, but under today's conditions the academy is entirely able to deal with the question of the sharp increase of the output of commodity production. In the opinion of S.T. Takezhanov, the Kazakh SSR Academy of Sciences needs to change direction somewhat, then it will be possible to organize cooperation with it in the way that this is now happening there with the Siberian Department of the USSR Academy of Sciences.

Academician of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin K.U. Medeubekov, chairman of the Presidium of the Eastern Department of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin, covered a number of problems that are facing agronomic science. First of all, the development of early-ripening, hardy, drought-resistant strains of agricultural crops, particularly grain crops, is necessary for the fulfillment of the Food Program. The Biocenter, of which a number of institutes became a part, was organized by the Council of Ministers. During the first years the work went well, now it has worsened significantly, there is no common goal, there is no plan of work. In connection with the development of virgin and fallow lands in our republic the fertility of soils worsened by 30-40 percent. A scientific sound program should be formulated for its restoration.

Joint efforts of applied and academic science are necessary for the solution of the problems connected with the improvement of the storage and transportation of agricultural products; water problems with respect to the agrarian sector; the conditions of the feeding and housing of experimental breeds; the economic forms of the management of production; the material and technical supply of science.

V.R. Krasnyanskiy, chief of the Main Territorial Administration for Construction in Alma-Ata and Alma-Ata Oblast attached to the Kazakh SSR Council of Ministers, noted that it is difficult for him to report on the fulfillment of the plan of construction of scientific facilities, since it comes to only 72 percent.

He told about the steps that are being taken by them in order to correct the formed situation by the end of the year. And he noted that the annual disruption of the work on academic projects is occurring because the Academy of Sciences either submits the documentation with a great delay or turns it over defective. Such was the case when designing the institutes of experimental biology, molecular biology and biochemistry, and others. In the opinion of V.R. Krasnyanskiy, it is inadvisable to combine the Main Administration and Akademstroy.

Continuing the discussion on construction, republic Minister of Highways Sh.Kh. Bekbulatov said that this year they are turning over a dispensary and noted that they are very displeased with the attitude of the academy toward the construction of the telescope. The ministry is bearing only losses. For 8 years the tower crane has been idle, because the main construction administration of the academy is not supplying the necessary equipment. Next year this facility is a start-up facility. If there is equipment, we will complete the facility.

As Kazakh SSR Minister of Public Education Sh.Sh. Shayakhmetov stressed, the February CPSU Central Committee Plenum adopted important decisions on the reform of public education, the improvement of the training of scientific personnel is under way. In the republic more than 12,000 instructors and scientific personnel and over 30,000 undergraduates and students are engaged in this work. They are performing annually more than 300 scientific research jobs, individual ones of them are becoming patent and license jobs and are attaining the international level. But only a handful of VUZ developments are finding application in the republic. New equipment for some reason is being assimilated outside it.

Taking into account the necessity of coordinating the work of the academy and the higher school and of solving the problem of scientific and technical acceleration in the republic, a program of the cooperation of academic institutes and higher educational institutions for the 12th Five-Year Plan was approved. For the first time a list of priority scientific directions of the 13th Five-Year Plan was drawn up and approved. An educational scientific production complex was established on the basis of the institutes of nuclear physics and high energy physics jointly with the Kazakh State University, an engineering center was established on the basis of the Institute of Metallurgy and Ore Dressing and the Alma-Ata Power

Engineering Institute. The coordinating work on mathematics and the biological sciences is of substantial importance in the enlistment of scientists of higher educational institutions in scientific research. The Academy of Sciences is playing a definite role in the coordination of scientific research throughout the republic and can make the choice and recommend for introduction developments proposed by higher educational institutions. However, the academy is not exerting practical efforts in the settlement of this question. The holding of competitions for the best work on the solution of many sectorial problems is not being practiced in the republic, as a result of which duplication in jobs in accordance with economic contracts on the part of institutes of the academy and higher educational institutions of Kazakhstan is often encountered. Therefore, our institutes are working more with the academies of other republics. The strengthening of cooperation between the Kazakh SSR Academy of Sciences and higher educational institutions is in the hands of the academy.

Chairman of the Republic Council of Ministers N.A. Nazarbayev, who on the basis of abundant factual material informed those who had gathered in detail about the state of affairs in the republic with respect to the fulfillment of the social program and about the results of the work in industry, agriculture, and housing construction and on consumer goods production and dwelt especially on the tasks that face scientists of the Academy of Sciences, delivered a long speech.

Concluding the discussion, President of the Academy of Sciences and Academician of the Kazakh SSR Academy of Sciences U.M. Sultangazin noted that at the meeting a principled discussion on academic problems had taken place and profound thoughts on questions of introduction and the development of the basic sciences had been expressed. The tasks facing scientists of the Academy of Sciences were formulated especially clearly in the statement of N.A. Nazarbayev. Such meetings aim scientists toward the new tasks and at the same time oblige them to work even more efficiently and to strive for new achievements. The government is displaying particular concern for the development of the academy—this is a requirement of the times. First Secretary of the Kazakh CP Central Committee G.V. Kolbin spoke 5 months before this meeting at a meeting of the Presidium of the Academy of Sciences, N.A. Nazarbayev is participating already for a second time. There is no doubt that the documents, which are adopted along the line of the Council of Ministers, will be specific, and the "perpetual" problems of the Academy of Sciences, which are carried over from year to year, will finally be solved. This meeting will be a turning point in the history of our Academy.

In conclusion President of the Kazakh SSR Academy of Sciences U.M. Sultangazin expressed deep gratitude to the government of the republic for attention to the Academy of Sciences and its problems, as well as to the representatives of industry and construction organizations, who actively participated in the work of the conference.

For the purpose of the unconditional and timely settlement of the examined questions the Presidium of the Kazakh SSR Academy of Sciences obliged the departments and scientific institutions to ensure the implementation of the previously adopted decrees of the General Assembly of the Kazakh SSR Academy of Sciences and the Presidium of the Kazakh SSR Academy of Sciences and the formulated measures on the increase of the efficiency of the work of the Academy of Sciences in light of the decisions of the Party Control Committee attached to the CPSU Central Committee (January 1987) and the Presidium of the USSR Academy of Sciences (May 1988).

The academician secretaries of the Physical and Mathematical Sciences, Earth Sciences, and Chemical and Technological Sciences Departments and the Central Kazakhstan Department were given the assignment to draft and submit for approval to the Kazakh SSR State Planning Committee an organizational plan of the establishment during 1989-1990 of the Cybernetics, Chemical Metallurgical, Machine Building, Physical Technical Problems, and other scientific technical complexes (NTK's).

The corresponding departments were charged to specify the plans of joint work with ministries, departments, and enterprises for 1988-1990, having envisaged in them the performance of joint work to 1991 and further in the future in the area of biotechnology, geology, nonferrous metallurgy, chemistry, the petroleum and gas complex, and other areas. To submit the corresponding proposals to the republic State Planning Committee.

The Biological Sciences Department was ordered within a 2-month period to settle with the Kazakh SSR State Agroindustrial Committee and the Eastern Department of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin the questions of the attachment if necessary to academic institutions of experimental farms and the participation of the academy in the work of the scientific production systems of the State Agroindustrial Committee.

The Presidium posed as one of the priority tasks of the Institute of Economics and the Council for the Study of Productive Forces of the Kazakh SSR Academy of Sciences to consider the formulation of the concept and programs of the changeover of the republic and its oblasts to self-financing.

The Earth Sciences, Chemical and Technological Sciences, and Biological Sciences Departments, as well as the Central Kazakhstan Department were charged to formulate a program of the complete use of raw materials, which has been approved by interested ministries and departments, and a program of work in the area of ecology and environmental protection.

The corresponding assignments were given to the Commission for Introduction and the departments of the staff of the Presidium of the Kazakh SSR Academy of Sciences.

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New Association To Raise Prestige of Engineers

18140214b Moscow SOVETSKAYA ROSSIYA in Russian 31 Mar 89 p 1

[Interview with E. Kalinin, doctor of technical sciences, by V. Ivanitskiy, under the rubric "Our Dialog": "The Engineer's Prestige, E. Kalinin, Doctor of Technical Science; first two paragraphs are SOVETSKAYA ROSSIYA introduction. Passages in boldface as published]

[Text] **"Many theoretical and engineering developments in the creation of high-voltage power lines, high-power electrical machinery, transformers, and electrical instrumentation for GOELRO [State Commission on the Electrification of Russia] were performed by professors, instructors, and students of the Leningrad Polytechnical Institute. The results of this and other work often surpassed the level for foreign technology. What has happened to us now? Why are we behind? Today even renowned technical vuzes [higher educational institutions] are experiencing difficulties in recruiting students...It seems to me that we must find one of the reasons for our backwardness in the decline in the prestige of the technical intelligentsia**
"B. Sizov, retired shipbuilding engineer Moscow"

This letter is one of many which ask the pointed question, How do we return dignity to the engineer? Perestroyka presents different ways to do this. We talked about one way with a department head at Moscow Aviation Technology Institute, Prof. E. Kalinin, doctor of technical sciences. The All-Union Association of Scientific-Technical Cooperatives was organized not long ago, and Elvin Konstantinovich was elected its president.

SOVETSKAYA ROSSIYA: The author of the letter quoted sees a solution in the founding of an association of degreed engineers.

E. Kalinin: The Union of Scientific and Engineering Societies of the USSR has already been founded, and such an association is planned within it. This pertains to the reader's specific suggestion. In general, his letter is close to me, and I understand it. In fact, the prestige of engineering and scientific work here is extremely low. Low pay, the lack of competition in technical vuzes and graduate school—all this is a consequence of the existing attitude toward personnel. It is embarrassing to hear about the sad fate of many discoveries and inventions which have lain on the shelf for decades.

The constituent congress of the All-Union Association of Scientific Technical Cooperatives and Cost-Accounting Organizations and Enterprises was founded to avoid this and to aid the radical economic reform. Scientific-technical service centers, young people's scientific technical creativity centers, and scientific-technical cooperatives from 42 cities in 8 union republics have united. The sponsors are the Union of Scientific and Engineering Societies of the USSR, the USSR Academy of Sciences, USSR GKNT [State Committee for Science and Technology], USSR VDNKh [Exhibition of National Economic Achievements], and the USSR State Committee on Education. The association's principles are voluntarism, the use of only economic methods of control, and decisions in the form of recommendations except for those stipulated by agreements.

SOVETSKAYA ROSSIYA: Can one assume that the association is an alternative to the "belts of introduction," inter-branch scientific-technical complexes and other previous bodies which couldn't manage large-scale introduction of scientific developments?

E. Kalinin: They couldn't because the conditions didn't exist. The association is helping to create them. Three thousand scientific-technical cooperatives comprise high-class specialists, including those from several NII [Scientific Research Institutes], NPO [Scientific Production Associations], and MNTK [Inter-Branch Scientific-Technical Cooperatives], where they simply could not be discovered. Many of them struggled their whole lives for their inventions and discoveries and now have the opportunity to carry out their ideas. Let's say that Honored Inventor of the RSFSR D. Yakovlev, chairman of the "Uskoreniye" Cooperative, is engaged in producing new materials and technologies on the basis of his developments. Zh. Zinchenko, doctor of technical sciences and the author of a series of inventions builds private airplanes. There are many such examples. The association includes primarily cooperatives that are very strong both scientifically and technically. They have been able to do a lot by leasing the idle equipment of scientific research institutes and state enterprises. For example, Rostov's "Tsentr" Inter-branch Scientific Production Association developed and electrical generator for dispersed power sources where the main element is a multi-layer piezoceramic converter. This means that energy can be produced through mechanical stresses. Let's say wind bending a piezoceramic sheet will generate an electrical current. Important? Obviously! This same cooperative is offering an unusual ultrasound diagnostic instrument: A doctor can look at the status of an organ on a color display screen. The instrument surpasses foreign models.

Let me cite other examples at random. Saratov's "Rezerv" Youth Center developed an original system which can take a remote electrocardiogram and an attachment to artificial circulation equipment for performing complex operations, waveguide instruments for treating suppurative pleural surfaces, all-purpose work places for children with poliomyelitis. Cooperatives under the Belorussian Gossnab have begun producing goods and raw materials from wastes. Especially curious is the cooperative at the Polytechnical Institute which developed an original technology for processing automotive tires. Foreign firms have contacted it—they want to buy a license.

SOVETSKAYA ROSSIYA: But they are solving all these complicated problems without the help of the newly created association. What good does it do them?

E. Kalinin: Some cooperatives, centers, and associations are already pressing their local limits. They are capable of more. By creating the association, we are multiplying their strengths so that they can take on large-scale projects on the basis of program-specific planning, which has proven itself in other countries. Specifically, the need for such planning was voiced as early as the 24th and 25th Party Congresses! But what happened? For example, GKNT took about 200 coordinated plans for different problems and renamed them "specific programs." But the basic principles of this planning—clear formulation of the goal and the basic steps to reach it, purposeful financing and resource supply—were not observed...For this reason little was done, for example, on various "intensification" programs.

So we intend to revive special program planning and to use it to hook up with many promising areas in different branches.

Don't forget that once included into state programs, the cooperatives will be ensured a stable income for many years; they will develop firm business contacts, gain experience, and raise the level of their output. In essence the association's presidium is a collective of managers combining existing random developments and new ideas into a single whole of nationwide importance. We just submitted proposals to the USSR Ministry of Health on participation in a program to create medical equipment, which is very scarce, as you know. We have set ourselves the task of not just development, but of its manufacture, including series production, as well as complete supply, guaranteed service, and training for the people who will operate the equipment. Problems of cooperation with chemical and wood complex are being analyzed in detail. The goals of the work are to automate technological processes, purify effluents, and re-process and use wastes. There is enough to do for many years. Negotiations with the State Committee on Education, Gossnab are being held...

But of course many cooperatives need help. The association presidium and its council will always be able to find an enterprise which will lease equipment, apparatus, and space and will help form a temporary collective to solve a particular problem. Association members pay small dues. Three percent of the amount stipulated in various agreements will be paid to its fund. This naturally means those concluded with the presidium's help. There are other ways to accumulate money—voluntary dues from sponsors, enterprises, individual citizens, sale of stock, etc. This money will go to help association members, to insurance and hard currency funds, a joint-stock bank.

The first thing to which we will allocate some money is to develop service centers for association members. They will include legal service centers, experimental production bases, and others.

SOVETSKAYA ROSSIYA: One wants very much to believe in the success of this venture. But a seed of doubt has sprouted: Won't it turn out to be like the shish-kebab cooperatives chasing after long, unearned rubles. There are already examples of this among the scientific cooperative members.

E. Kalinin: The guarantee against this is primarily with us, with the areas of work we have selected. Let me repeat, we are for large scale, high-level developments. World experience shows that it is not the giants, but the small and medium-sized companies who are dynamic, capable of the rapid adjustment and risk-taking that make a decisive contribution to accelerating scientific-technical progress. The cooperative are like that; the time has come to create joint state-cooperative ventures. Their convergence in the interests of a deal on the basis of contractual relations will have a tremendous effect. Equipment productivity will rise, and earning will grow. Today, when military programs are being cut back, defense enterprises are among the first to rise to the task of finding new business. Some have already shown an interest in the association. In general, the association as it will appear in the future is a network of small and medium-sized companies across the entire company. Then we will be able to solve any problem.

As regards attempts of individual cooperative members to grab what they haven't earned, their activity is easily subject to economic regulation. Laws should also provide guarantees. I understand than many things did not happened as it was presumed when the Law on cooperation was formulated. But there is no need to rush to rewrite it. How can we dump everyone into a single pile, both the shish-kebab co-ops and those who hold the technical and scientific prestige of the country dear? Today we need a fair tax on activity which would stimulate production of needed goods and rapid development of the industrial base. I believe that the income tax cooperatives pay to the development fund should not exceed 3-5 percent or should be entirely eliminated. This will be an incentive to accelerate scientific-technical progress.

Lawmakers must take into account that it is the mafia, the "godfathers" of the shadow economy that are primarily interested in the weakening of the cooperative movement. Their motives are clear! In a healthy economy the deficit, the soil for speculation, will disappear. The dealers need chaos, confusion, and dissatisfaction. For example I haven't seen imported goods in the stores for a long time now, but I know that Moscow gets them. Where are they! There is a lot on the market for crazy money. It is resold under the cover of cooperation. I am against such "colleagues." It is they who are guilty of the ridiculous rumors that the cooperatives have bought up

all the meat, soap, and laundry powder. We specially calculated that if all cooperatives in existence today, including technical ones, would use all their income to buy meat, this would account for 30 of the 65 kilograms we eat annually.

SOVETSKAYA ROSSIYA: Elvin Konstantinovich, when will the association's programs begin to produce results?

E. Kalinin: Many, by the end of this year. Let me say directly that the rate is unwonted. But the explanation is simple. Dignity is being returned to the business man, the specialist, and the researcher. For these people there is no greater incentive than public recognition of the need for their labor. Only then will one want to work for real.

Controversy Surrounds Departure of Head of Water Problems Institute

18140214a Moscow IZVESTIYA in Russian 31 Mar 89 p 3

[Article prepared by Science and Technology Department: "To Whom To Pay Our Debts?: Once Again on Evaluating the Attitudes and Performance of the USSR Academy of Sciences Institute of Water Problems and Its Former Director G. Voropayev"]

[Text]

To the editors of "Izvestiya"

"The USSR Academy of Sciences Institute of Water Problems' Party Office has reviewed correspondent K. Smirnov's interview with Academician A. Yanshin titled 'Time To Pay Debts' published in your newspaper (1988, No. 362). In this interview Yanshin said particularly that G. Voropayev, the director of the Institute of Water Problems, 'was removed from his position in August of this year because of major errors.'"

"The actual decree of the USSR Academy of Sciences Presidium of June 17, 1988, signed by A. Yanshin, vice-president of the USSR Academy of Sciences, thanked Voropayev for the results of scientific research and financial economic activity.

"G. Voropayev was relieved of his position on July 12, 1988 at his own request, and he was thanked for many years of conscientious work.

"Regarding the construction of the scientific research station, in compliance with the decree of the CPSU Central Committee and the USSR Council of Ministers of December 21, 1978 (a decree approved for promulgation—ed.), the USSR Ministry of Land Reclamation and Water Resources offered to finance the Ivankovsk NIS [Scientific Research Station], but quickly withdrew the offer, and the primary expenses were assigned to the USSR Academy of Sciences.

"Documents thus testify to the groundlessness of the claims your newspaper published regarding USSR Academy of Sciences corresponding member Voropayev and the institute's financial dependence on the USSR Ministry of Land Reclamation and Water Resources. The Party Office asks that you print our opinion in 'Izvestiya' and apologize to G. Voropayev.

"Yu. Obyedinov, secretary, Party Office, USSR Academy of Sciences Institute of Water Problems"

The editors received letters with similar content from V. Mastechkin, senior scientific associate at the Institute of Water Problems; I. Rusinov, honored reclaimer of the RSFSR; and A. Averin, labor veteran.

At the same time the newspaper received the following letter:

"I read the 'Izvestiya' interview with Academician Yanshin on problems of ecology. I think his viewpoint is useful and important, but I want to clarify one detail. The interview said that Voropayev was relieved of his duties as director of the USSR Academy of Sciences Institute of Water Problems (IVP) for poor performance. In actuality this is entirely true; formally, according to the position held by the Division of Oceanology, the Physics of the Atmosphere, and Geography (OOFAG, Academician Secretary D. Brekhovskikh) and by the USSR Academy of Sciences Presidium, he left at his own request and was even thanked for many years of conscientious work, i.e., he again came up smelling like a rose.

"At a general meeting of the Academy of Sciences in October of last year, I proposed that this gratitude be countermanded. The entire room broke into applause. Academician G. Chernyy repeated this proposal at the next general meeting of the Academy of Sciences in December, 1988. The response? The Academy of Sciences' leadership remained silent.

"I think that at this point it's more than a matter of unwillingness to act on principle and call a spade a spade. Under complete glasnost, in sending off Voropayev, there would be a bad word for more people than him alone.

"When, for example, in 1986 a decree from CPSU Central Committee and USSR Council of Ministers on the cessation of work on redirecting the flow of rivers was issued, the project proposed by Academician L. Brekhovskikh as a solution at a meeting of the OOFAG office did not even mention this decree. Then there was an item against criticism of G. Voropayev that appeared in the press. That time they managed to correct these omissions. But before and after this case Academician Brekhovskikh, with the silent consent of the Academy of Sciences Presidium, removed first the IVP and then its director from open and vocal criticism.

"But the cat always gets out of the bag. Isn't it better for the leadership of the Academy to open the bag itself and in broad daylight soberly and honestly to determine whether it hasn't burdened its conscience with excess moral baggage by declaring earnest service to the wasteful ideas of the Ministry of Land Reclamation and Water Resources 'many years of conscientious labor.'"

"A. Monin, corresponding member, USSR Academy of Sciences"

On December 6, 1988, when the USSR Academy of Sciences Presidium approved the new director of the IVP, M. Khublaryan, several speeches again stated that the institute had lost the look of an academic center and was energetically promoting the redirecting of rivers and that there were serious errors in the work of the IVP's leading associates, including G. Voropayev.

It was even proposed that the IVP be dissolved. It caused a serious debate, the results of which G. Marchuk, president of the USSR Academy of Sciences, summarized in the following way. He said that he and the entire academy were ashamed of the IVP. According to him, the prestige of the IVP and, with it, the Academy of Sciences, had drastically declined. The institute's management did not have sufficient scientific understanding and wisdom to reorient research to new, more progressive areas; it has continued pounding the same old beat, and we are deeply offended that an Academy institute has brought itself to such a state. It is precisely because the IVP has no real concept elevating the institute to the level of the USSR Academy of Sciences' best collectives.

Nevertheless, citing the need to observe democratic principles and the desire of the Academy leadership to transfer the initiative in solving their problems to divisions and institutes (in the IVP elections Khublyaran had indeed received full support—four-fifths of all votes), the president proposed to keep the IVP and approve its new director—but under the condition that the institute be radically restructured. Academician G. Marchuk also proposed that the Academy Presidium review the matter a year later to see whether the institute had succeeded in getting out of the crisis.

"Izvestiya's" Science and Technology Department does not believe that it is its place to give an exhaustive evaluation of the work of Academy institutes and their managers. This is the business of the Academy and its Presidium. But if even the IVP and its former director Voropayev have become a definite symbol of the departmental approach to solving water problems in the eyes of the general public (hundreds of readers' letters, numerous articles in the press), then the reader is always right.

However, in this case it is not a matter of general public opinion, but of a specific question: Just how does the Academy, its scientists, and its management rate the IVP and its activity when Voropayev headed it.

A letter from the current secretary of the IVP Party Office shows that this rating was high and that it was documented by the thanks of the Academy leadership. But this same Academy of Sciences has another set of evidence and documents that assess the institute and its former director differently.

A special commission was created at the Academy to check the IVP's work. Commission members agreed with the general evaluation of this work, but disagreed on what steps should be taken. A significant percentage of its members expressed a particular opinion. Their viewpoint is reflected in the "Finding on the Activity of the USSR Academy of Sciences Institute of Water Problems" signed by Academician B. Laskorin, chairman of the Academy Presidium Commission on the Problems of Preserving Natural Water, Academician A. Trashnikov, director of the Institute of Lake Management, and several other scientists.

"Starting in 1977, after Director Voropayev's appointment as head, the institute took up the so-called scientific substantiation of the redirecting of some of the flow of northern and Siberian rivers. As a result, under Voropayev's leadership the institute increasingly lost the features of an Academy institution and became essentially a branch institute of the USSR Ministry of Land Reclamation and Water Resources under the USSR Academy of Sciences.

"Decrees of five divisions of the Academy pointed out the extremely low level of the scientific research work done to justify the territorial redistribution of water resources. This phenomenon is unprecedented in the history of the USSR Academy of Sciences.

"The institute researched the prediction of water conditions in closed reservoirs (the Caspian and Aral Seas and others). The prediction of the level of the Caspian Sea contradicts the actual process and is recognized to be scientifically defective. The IVP's erroneous prediction disoriented planning and economic agencies, as a result of which the Karabogaz Gulf was cut off.

"The institute did not do comprehensive scientific research on the quality of water or on protecting it from pollution; rather it assumed a passive stance in this vital matter. The individuals guilty of polluting unique bodies of water (Lake Baykal, Lake Ladoga) unquestionably include the leadership of the Institute for Water Problems.

"The country's water management has been thrown into confusion, it has had a destructive effect on nature and the economy and has been the subject of pointed discussions and a reason for social tension. A catastrophic ecological situation has been created in the regions of Syrdarya, Amudarya, and the Aral Sea. It is noteworthy

that this incorrect water management policy has been supported and scientifically 'justified' for many years by the Institute of Water Problems and by G. Voropayev personally."

References to documents could go on. Logically, they point to the solution about which Academician Yanshin spoke in his interview with "Izvestiya." But paradoxically, the actual solution was different. The Academy Presidium accepted Voropayev's voluntary retirement and sent him off with thanks.

Academician Yanshin's signature appears under the resolution of gratitude to Voropayev and his reward "for the results of completing the plan of scientific research and for results of financial economic activity for 1987"—less than a month before his retirement. Yanshin emphasized Voropayev's name. But when the decision on this matter from the office of the division in which the IVP is included appeared on his desk signed by Academician Secretary L. Brekhovskikh, it had to sign the order thanking Voropayev and rewarding him citing this decision, since he did not think it possible to counterpose his opinion to that of the collective.

Some of our readers will hardly accept Academician Yanshin's explanation as adequate. A defense of principles should be uncompromising. To be just, we have to say that the signature under the order based on the Division of Oceanography, Physics of the Atmosphere, and Geography's presentation was a temporary weakness on Yanshin's part. And he did not agree with or sign the Academy Presidium's decision which quicly followed, relieving Voropayev at his own request.

That's how it stands with gratitude to Voropayev. The IVP Party Office essentially disputes Yanshin's assertion that this institute under Voropayev "was turned into an obedient servant to the USSR Ministry of Land Reclamation and Water Resources's will." But Yanshin is not the only one to express this thought. It is important not to be distracted from this key issue, although the specific question whether the Ministry bought the institute a boat and built it a station—and if it did build it, by whose decree—is just as important.

The problem is a serious one and requires an additional check, the results of which we will immediately report to the reader. But in any case it does not eliminate another question addressed directly to the Academy of Sciences' Presidium: Why does the USSR Academy of Sciences shy away from public evaluation of the attitudes and activity of the IVP and of Voropayev personally? What does gratitude to Voropayev mean—the actual assessment of many years of socially useful labor or simply—according to the generally accepted stereotype—thanks for the fact that the man left quietly, relieving the management of the need to draw harsh conclusions?

When Yanshin said and the newspaper printed that Voropayev had been fired, it was wishful thinking. And this was entirely possible. But by recognizing this inaccuracy, we are in no rush to apologize to Voropayev. So far the Academy Presidium has not responded to the questions posed in this publication.

The Academy itself should at last define its position in a precise and clear assessment of the IVP's scientific level during Voropayev's directorship and of his personal civic and scientific position. If this level, this position are considered like beams of light in a stagnant fog, then we all, the newspaper included, will have to sincerely apologize to Grigory Vasilyevich. Let's be honest with one another—his departure is linked if not formally then in fact with a negative assessment of his activity by public opinion, including Academic opinion.

But if this is not so, if the scientists who, overall, rate both the IVP and the attitude of its leader in the era of stagnation as a typical expression of those times are right, in that case the assessment should be also precise and honest, on the basis of internal cost.

The entire truth must be told about what the IVP and its director were like. Not only for the sake of knowing to whom to pay the debts of the past. This is our debt to the future. Without it we cannot answer the main question, What will the Academy's lead institute for water problems be like today and tomorrow?

Our newspapers' readers are expecting the Academy Presidium to dot all the i's and cross all the t's in this protracted debate, without shying away from comprehensive analysis of its scientific aspect or from the question of the attitudes and responsibilities of specific scientists.

Georgian SSR Awards Prizes for Science, Technology

18140213 ZARYA VOSTOKA in Russian
25 Feb 89 pp 4, 5

[Article: "On the Award of Georgian SSR State Prizes in Science and Technology"; passages in boldface as published]

[Text] **The Central Committee of the Georgian Communist Party and the Council of Ministers of the Georgian SSR, have reviewed the recommendation of the Committee on State Prizes of the Georgian SSR in Science and Technology of the Georgian SSR Council of Ministers, decrees the award of the 1989 State Prizes of the Georgian SSR:**

In Science:

1. **Giye Vakhtangovich Gokiyeli**, doctor of medical sciences, professor, Department of Surgery, Tbilisi State Medical Institute; **Georgiy Andreyevich Kakoishvili**, doctor of medical sciences, professor, the Department of Surgery of the same institute; **David Dmitriyevich Tvildiani**, doctor of medical sciences, honored scientist of the Georgian SSR, professor, chairman of the Department of Internal Medicine of the same institute; **Zurab Georgiyevich Tsagareli**, doctor of medical sciences, honored scientist of the Georgian SSR, head of the Department of Cytology of the Institute of Experimental Morphology imeni A. N. Natishvili of the Academy of Sciences of the Georgian SSR;

—for a series of works: "Acute Ischemia of the Myocardium and Restoration of Heart Activity," published in 1967-1987.

2. **Guram Sergeyevich Chilaya** (director), doctor of physical and mathematical sciences, assistant director for science of the Institute of Cybernetics of the Academy of Science of the Georgian SSR; **Semen Nikolayevich Aronishidze** (deceased), **Clara Danilovna Vinokur**, candidate in physical and mathematical sciences, senior scientific associate of the Department of Controllable, Optically Anisotropic Systems of the same institute; **Kokhta Georgiyevich Dzhaparidze**, doctor of chemical sciences, professor, director, Department of Optical Chemical Information Media of the same institute; **David Germanovich Sikharulidze**, candidate in physical and mathematical sciences, director of the Laboratory Solid-State Optical Image Converters of the same institute; **Zaze Mikhaylovich Elashvili**, candidate in chemical sciences, senior scientific associate, lead scientific associate of the Department of Optical Chemical Information Media of the same institute;

—for a series of works: "Liquid Crystals with Induced Spiral Structure for Information Representation Systems," published in 1975-1988.

In Technology:

1. **Aleksandr Vladmirovich Kachakhidze** (director), veterinarian, honored veterinarian of the Georgian SSR, candidate in veterinary sciences, senior scientific associate of the Department of the Study of Poultry Diseases of the Georgian Zootechnical Veterinary Education and Research Institute; **Yason Erastovich Dzhamrulidze** (deceased), **Abselam Tariyelovich Machavariani**, veterinarian, candidate in veterinary sciences, head of the Department for the Study of Avian Diseases of the same institute; **Meri Luarsabovna Mdivani**, zootechnician, candidate in economic sciences, director of the Noriysk Experimental Demonstration Poultry Plant of the Gardabansk Region of the Georgian SSR; **Eteri Godiyevna-Khorguani**, veterinarian, candidate in veterinary sciences, junior scientific associate of the Transcaucasian Division of the All-Union Scientific-Research Institute of Veterinary Hygiene; **Vasiliy Alekeseyevich Chikadze**, veterinarian, candidate in veterinary sciences, chief veterinarian, Noriysk Experimental Demonstration Poultry Plant of the Gardabansk Region of the Georgian SSR; **Tristan Titikoyevich Chkoniya**, veterinarian, candidate in veterinary sciences, senior scientific associate of the Transcaucasian Division of the All-Union Scientific-Research Institute of Veterinary Hygiene;

—for the work: "Development and Introduction of a High-Productivity Method for Dust Aerosol Vaccination of Poultry Against Newcastle's Disease by Spraying Dry Virus Vaccines" performed in 1972-1988.

For Texts and Instructional Manuals

1. **Giye Grigoryevich Gvaramiya** (director), engineer, honored engineer of the Georgian SSR, candidate in technical sciences, director of the Main Computer Center of the Ministry of Popular Education of the Georgian SSR; **Isolde Ilinichna Margvelashvili**, physicist, group director, Department of School Computerized Information Processing of the same center; **Lele Shalvovna Mosiashvili**, mathematician, group director, Department of School Computerized Information Processing of the same center; **Aleksandr Sergeyevich Naskidashvili**, mathematician, group director, Department of School Computerized Information Processing of the same center; **Nanuli Vasilyevna Shatirishvili**, philologist, senior programming engineer, Department of School Computerized Information Processing of the same center; **Aleksandr Abramovich Eligulashvili**, mathematician, candidate in physical and mathematical sciences, group director, Department of School Computerized Information Processing of the same center;

—for the work: "Development of Computer-Based Automated Teaching Aids for General Education Subjects and Their Introduction into the Instructional Process," carried out in 1980-1988.

2. **Mikhayl Samsonovich Giginenshvili** honored scientist of the Georgian SSR, doctor of medical sciences, consulting professor, Department of Obstetrics and Gynecology, Tbilisi State Medical Institute; **Mikhayl Mikhaylovich Giginenshvili**, doctor of medical sciences, professor, head of the Department of Obstetrics and Gynecology of the same institute;

—for the textbooks: "Obstetrics" and "Gynecology" published by "Ganatleba" Publishing House in 1983 and 1987.

D. Patiashvili, secretary, Central Committee, Communist Party of Georgia

O. Cherkeziya, chairman, Council of Ministers, Georgian SSR